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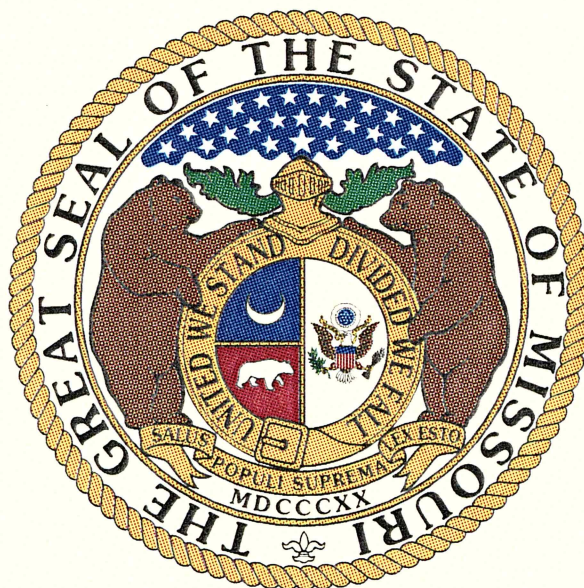
DEPOSITORY DOCUMENT

Missouri Energy Futures Coalition

Final Report

February 18, 1997

Mel Carnahan, Governor



This publication was prepared with the support of funds from the Oil Overcharge Settlement and State Energy Program through the U.S. Department of Energy (U.S. DOE) and the Missouri Department of Natural Resources' Division of Energy. However, any opinions, findings, conclusions or recommendations expressed herein are those of the Missouri Energy Futures Coalition and do not necessarily reflect the views of U.S. DOE or the Missouri Department of Natural Resources.

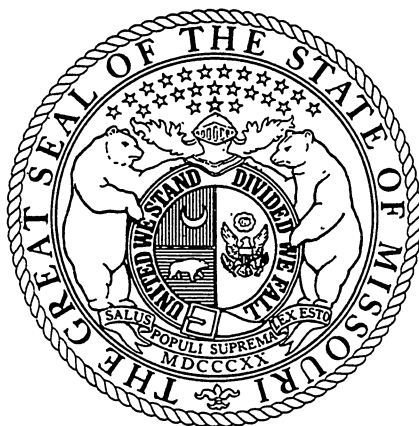
Missouri

Energy Futures Coalition

Final Report

February 18, 1997

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Missouri Energy Futures Coalition

February 18, 1997

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Governor Mel Carnahan, the Missouri General Assembly and the people of Missouri:

Energy drives Missouri, not only in the sense of moving our vehicles, but also in terms of heating our homes, powering our factories and sustaining the state's businesses and economic vitality. In a sense, energy is the cornerstone of our economy. Without it, we won't survive. With it, we can grow and prosper, but it must be used wisely.

Energy provides Missourians a significant opportunity to improve our economy and enhance our environment at the same time. Whether we consider home heating and air conditioning bills, the fuels we use to move people and freight, or the energy for our manufacturing plants, we know there are substantial opportunities for efficiency that will result in savings in energy costs and reductions in emissions from burning fossil fuels.

In the Fall of 1994, the Missouri Energy Futures Coalition was established by Executive Order 94-10. Prominent and distinguished representatives of business, industry, labor and the environmental community were appointed by the Governor to serve. The Coalition's first job was to review the *1992 Missouri Statewide Energy Study*, which provided a foundation of information on Missouri's energy use. This was followed by an examination of options available to improve our economy and use energy more efficiently.

The Coalition issued an interim report in October 1995 that detailed our work to that point. For the past year, the Coalition has worked to craft a set of recommendations for action by the citizens of Missouri. The report we present today is a framework for ensuring that Missouri can efficiently prepare for the 21st Century with an economically sustainable and environmentally sound approach to our energy use.

This report is the result of hundreds of hours of volunteer time contributed by the members of the Coalition. Whether in agreement or disagreement, the Coalition's discussions always maintained a positive spirit of commitment toward enhancing the economy, the environment and quality of life for all Missourians. In our disagreements, we found compromise, and, in our differences, we found opportunity. This report represents the best of our deliberations.

This report is also the result of the dedication and hard work of members of the staff of the Department of Natural Resources' Division of Energy and Environmental Improvement and Energy Resources Authority. Without their knowledge, time and perseverance, we would not have completed our work.

We invite your review and comments on this report. More importantly, we invite your commitment to the implementation of the recommendations contained in it. It is important that we all join together to ensure our sustainable future.

Sincerely,



Peter Dreyfuss, Chairman

EXECUTIVE ORDER 94-10

WHEREAS, the Environmental Improvement and Energy Resources Authority and the Division of Energy of the Department of Natural Resources have completed the comprehensive Missouri Statewide Energy Study; and

WHEREAS, the methodology of the study provided input from a broad array of interested parties encompassing social, economic, and political issues that impact the State of Missouri and its citizenry; and

WHEREAS, the Statewide Energy Study provides initiatives, recommendations, and action items to be considered for implementation to further the development of a long-term energy policy for the State of Missouri; and

WHEREAS, House Concurrent Resolution 16, as passed by the First Regular Session of the 87th General Assembly, mandates a written review of the state's obligations under the federal Energy Policy Act of 1992 to include specific mention of energy efficiency, construction technology improvements, and cost savings; and

WHEREAS, a long-term energy policy contributes to the creation of a sustainable future in Missouri by using energy more efficiently, strengthening the economic base, and improving the environment; and

WHEREAS, development of energy policy and commitment of limited resources should be guided by a coordinating body, organized and assembled to reflect the interests of citizens, organizations, private business, utilities, and other energy interests;

NOW, THEREFORE, I, Mel Carnahan, Governor of the State of Missouri, by virtue of the authority vested in me by the Constitution and laws of the State of Missouri, do hereby establish a body to be known as "The Energy Futures Coalition" as follows:

1. The Coalition shall be composed of at least 20 members and no more than 30 members, appointed by the Governor and serving at the pleasure of the Governor. Membership shall include representatives of the citizenry-at-large, not-for-profit entities, representatives of the private sector, utilities and other energy providers, universities, research organizations, media and local government.
2. Within thirty days after the appointment of the members, the Coalition shall meet and organize by selecting, from among its members, chairman, vice-chairman and five members to form an executive committee to act for and within the larger body. The Coalition may make rules and orders for the regulation of its proceedings as it deems proper, and a majority of its members shall constitute a quorum. The Coalition shall meet at least quarterly, as determined by the chairman. The executive committee shall meet more frequently, as determined by the chairman.
3. The primary role of the Energy Futures Coalition is to serve in an advisory capacity to the Governor. The Coalition will not design or operate actual programs, thus, preserving the objectivity and independence of the Coalition from any energy organization or program.

4. The initial focus of the Coalition shall be a thorough analysis of the Statewide Energy Study to identify long-term requirements and opportunities, establish priorities for these based on the final report as mandated by NCR 16, and develop a consensus for recommendations and priorities on which others may act to create a sustainable energy future.
5. The duty of the Coalition is to keep the citizens of Missouri updated on progress toward a more energy-efficient future. The Coalition shall report such progress on an annual basis.
6. Within one year from the Coalition's first meeting, the Coalition shall provide the General Assembly and the Governor with a written report addressing the findings of the Coalition and recommendations for state action.
7. Members of the Coalition shall receive no compensation for their services, but will be reimbursed for their actual and necessary expenses connected with the performance of their duties.
8. The Division of Energy of the Department of Natural Resources and the Environmental Improvement and Energy Resources Authority shall assist the Coalition and provide such services as may be required.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the Great Seal of the State of Missouri, in the City of Jefferson, on this 2nd day of March, 1994.

[Mel Carnahan's signature]
GOVERNOR

ATTEST:
[Judith K. Moriarty's signature]
SECRETARY OF STATE

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**Summary
of
Policy Recommendations**

Summary of Policy Recommendations

General Introduction

Mission

To develop a practical and innovative plan to improve Missouri's economy, develop clean, domestic energy resources, increase energy efficiency and improve environmental quality by finding opportunities, forging partnerships and exploring links throughout the state's organizations and people.

Overview

Energy touches virtually every aspect of our lives. It heats and cools our homes, powers our automobiles, runs our farms and factories, and provides the power that makes businesses work. Energy enriches our lives, keeps us employed and takes us where we want to go.

Energy plays an integral role in the Missouri economy. Each year, Missourians consume about 1,103 trillion British Thermal Units (Btus) of energy. If all forms of energy used — electricity, natural gas, gasoline and diesel fuel, and wood or other fuels — were converted into petroleum, the 1,103 trillion Btus would equal 190 million barrels of oil. Measured on a per capita basis, that means each Missouri resident uses an average equivalent of 36 barrels, or 1,500 gallons, of petroleum annually.

The 1992 *Missouri Statewide Energy Study* reported that energy supported personal incomes of nearly \$90 billion and sustained directly or indirectly almost 3 million jobs for Missouri's 5.1 million residents. In 1990, Missourians spent approximately \$10 billion for all uses of energy. This figure indicates approximately 10.8 percent of total personal income went for energy expenses. As a comparison, the United States as a whole devoted only 10.2 percent of its personal income to energy expenditures during the same period.

Because Missouri depends on fossil fuels from other areas, most of the dollars leave our state immediately. If we reduce that amount, even by a small percentage, we save money, help the Missouri economy by retaining dollars in the state and enhance our environment through wiser use of natural resources.

The 1992 *Study* reported that energy processes account for 75 percent of all air emissions nationally, primarily through three forms of energy production and consumption: motor fuels, electricity production and natural gas consumption. Many health-related issues have been linked to the energy production and use cycle. In Missouri, both St. Louis and Kansas City are experiencing serious air quality problems, primarily because of the use of fossil fuels.

Summary of Policy Recommendations

In 1990, Missouri's electric generating capacity was more than 70 percent coal-fired compared to a U.S. average of less than 44 percent. Because of this, Missouri's emissions of sulfur dioxide and nitrogen oxides, which are linked to acid rain, are greater than most neighboring states. The 1992 *Missouri Statewide Energy Study* also states that energy production and use accounts for nearly 50 percent of greenhouse gas emissions including carbon dioxide. Therefore, any effort to reduce the creation of greenhouse gases and the potential for resultant global climate change should focus on energy production and use.

If Missouri lowers overall energy use through investment in cost-effective, energy-efficiency measures and increases the use of alternative or renewable forms of energy, the saved dollars mean additional discretionary income for Missourians and an improvement in the overall quality of our environment.

Coalition Process

Through Executive Order 94-10, Governor Mel Carnahan in 1994 established the Missouri Energy Futures Coalition to thoroughly analyze the 1992 *Missouri Statewide Energy Study*, identify long-term requirements and opportunities, establish priorities, and develop a consensus for recommendations on which others may act to create a sustainable energy future. The Governor ordered the Coalition to regularly update the citizens of Missouri and to report annually regarding progress toward a more energy-efficient future.

Working closely with the staff of the Department of Natural Resources' Division of Energy, the Environmental Improvement and Energy Resources Authority, and other state departments, and with private businesses and other interested organizations and citizens who generously committed their time, the Coalition named committees to examine four key areas: Information, Education and Incentives; Transportation; Residential, Commercial and Industrial Buildings; and Alternative- and Renewable-Energy Supplies. The Coalition developed preliminary recommendations in these four areas and presented them in an interim report to Governor Carnahan in October 1995.

The Missouri Energy Futures Coalition then developed new policy recommendations from a composite list of goals, objectives and policy recommendations derived from its own 1995 interim report, the policy recommendations offered by both the 1992 *Statewide Energy Study*, and the *Economic Opportunities Through Energy Efficiency and the Energy Policy Act of 1992: Report to the Missouri Legislature Pursuant to House Concurrent Resolution 16 (HCR 16)*. In addition, the Missouri Department of Natural Resources suggested several policy recommendations.

After developing new recommendations, the Coalition examined current or pending policy initiatives, legislative actions, and administrative policies under the jurisdiction of Missouri's state agencies that might facilitate the adoption of the proposed policy.

The Coalition asked Missouri Department of Natural Resources staff to propose specific actions to promote the adoption of the recommendations. The Coalition selected several key actions and presents them in this report with each proposed policy recommendation.

Summary of Policy Recommendations

To complete the policy development process, the Coalition identified several programs and projects currently operating in Missouri, other states and at the federal level that demonstrate the practical results that may be derived from the adoption of these proposed recommendations.

We are pleased to submit for your consideration this report of the Missouri Energy Futures Coalition. The adoption of these recommendations will enhance Missouri's economy and environment through the implementation of energy-efficiency policies, programs and actions.

Summary of Policy Recommendations

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Summary of Policy Recommendations

Education, Information, Marketing and Incentives

Introduction

In a 1992 Department of Natural Resources marketing survey, when asked about state performance in natural resource policy areas, respondents indicated the state needed to increase activity in promoting alternative energy sources (65 percent), educating the public about energy conservation (57 percent), encouraging energy conservation and efficiency (54 percent), educating the public about environmental protection (56 percent) and promoting alternative transportation (50 percent). Missourians want reliable energy information to make informed decisions. Policymakers in particular need accurate, timely data and analysis.

The Coalition developed the following energy information and education recommendations to the Governor, drawing upon the expertise of environmental and energy professionals, the 1992 *Missouri Statewide Energy Study* and the HCR 16 report, *Economic Opportunities through Energy Efficiency and the Energy Policy Act of 1992*. A list of related state and federal policies supports each recommendation. Finally, the Coalition presents examples of current activities and further actions that could support adoption and implementation of its recommendations. If adopted, these recommendations will help improve Missouri's energy information base and increase accessibility to that information.

Goal

Provide timely, reliable energy information, and educate and raise the awareness of Missourians about energy efficiency and alternative consumer choices that provide a sound, clean environment and economic vitality.

Objectives

- Raise public energy awareness, and assure that Missouri citizens have timely access to reliable information about how energy choices are related to environmental and economic quality of life.
- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.
- Recognize outstanding achievements and develop other incentives that encourage voluntary advancement of energy efficiency, appropriate technology and renewable energy resources in the state of Missouri.

Policy Recommendations

Recommendation #1:

Develop a coordinated, accessible public information network, linking data from diverse, reliable information resources. Include public access to information regarding current energy policy and economic, technical and consumer issues that originate from federal, state and public agencies, as well as the private sector.

- ✓ Create a public information service network to include the state's Energy Information Resource Center.
- ✓ Select communication media to reach all population and organizational sectors.
- ✓ Compile, create and disseminate quality consumer and technical energy information.
- ✓ Expand the energy-related public information base by supporting quality economic, environmental and other energy-related data collection, analysis and reporting.
- ✓ Support energy-efficiency education information for low-income families.

Recommendation #2:

Develop and implement a public education curriculum for opportunities to increase energy literacy.

- ✓ Instill basic consumer awareness of the effects of energy production and use.
- ✓ Encourage energy knowledge in conjunction with basic educational assessment programs, where appropriate.
- ✓ Promote development and use of quality energy education resources.
- ✓ Recognize teachers and programs that are outstanding in achieving energy education goals.
- ✓ Establish energy internships for post-secondary students.

Summary of Policy Recommendations

Recommendation #3:

Develop a program of performance indicators to evaluate progress toward energy-related goals arising from the state's energy policy.

- ✓ Develop, monitor and annually report on state energy indicators.

Recommendation #4:

Develop a decision-making process that assigns the responsibility for collecting, analyzing and applying new energy data into decision-making processes, building on such foundations as the 1992 energy study.

- ✓ Designate the Department of Natural Resources in cooperation with the Office of Administration as coordinating agencies to promote state-regional intergovernmental decision-making on targeted energy issues.
- ✓ Establish a joint independent energy-efficiency technical assistance program between the Missouri Department of Transportation and the Missouri Department of Natural Resources.

Recommendation #5:

Encourage the development of promotional programs for energy efficiency in both the public and private sectors.

- ✓ Establish Governor's Energy Award.
- ✓ Include innovative and effective energy-efficiency promotional campaigns in recognition programs, for both public and private organizations.
- ✓ Take advantage of state and national media interests to publicize energy's link with environmental and economic issues.
- ✓ Publicize outstanding local accomplishments.
- ✓ Use or commission quality public service announcements and other professional promotional campaign products from national organizations, for state cost-sharing on promotional/information development expenses.

Summary of Policy Recommendations

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Summary of Policy Recommendations

Transportation

Introduction

For Missouri, the transportation sector is the largest consumer of energy. The 1992 *Missouri Statewide Energy Study* estimated transportation's share of all energy used in Missouri at 41 percent in 1990.

In Missouri, there are as many motor vehicles registered as there are people. Motor vehicles, and particularly the automobile, represent the single largest mode of transportation in the state. Missourians drive their cars an estimated 57 billion miles per year. Nationally, household vehicle miles traveled increased 82 percent between 1969 and 1990 while total population grew only 21 percent.

During 1990, the state's energy expenditures totaled approximately \$9.7 billion, with transportation expenditures accounting for \$4 billion. Of the available transportation fuels, virtually all of which are imported, petroleum represented the largest source.

The volume of wholesale motor fuel imported from outside Missouri, including all gasoline, diesel fuel, and gasohol, amounted to more than 2 billion gallons.

The state's per capita use of transportation energy is higher than the U.S. average, partly because the state has more licensed drivers per capita than the nation as a whole (69 percent of the state population compared to 67 percent for the United States).

Comparing transportation efficiencies reveals an even more important factor. Although the United States had a 1990 average automobile fuel efficiency of 21 miles per gallon (m.p.g.), Missouri's average was only 19 m.p.g. The state's m.p.g. rating for its entire fleet of cars, trucks and buses was also well below the U.S. average of 17 m.p.g.

Missouri is involved in several activities that affect the current and future availability and affordability of our transportation system. This section presents a summary of transportation policy recommendations. If adopted, these recommendations will help promote transportation energy efficiency, educate and encourage Missouri citizens to be involved in transportation decisions, and provide greater mobility for all people.

Goal

Improve Missouri's economic productivity by (1) establishing a decision-making process for transportation-related investments by the State of Missouri, metropolitan planning organizations and public transportation providers — taking into account the total cost-effectiveness of the proposed investment, including all costs and benefits across all modes and fuels — and by (2) promoting energy-efficient transportation decisions by the private sector and citizens of Missouri.

Objectives

- Coordinate the efforts of state agencies, transportation planning organizations and public transportation providers in transportation planning and decision-making.
- Identify performance indicators, set up required data collection processes to track the indicators and develop goals.
- Establish uniform methods for determining the full costs and benefits of proposed transportation investments.
- Take advantage of opportunities for creating an awareness of energy-efficiency concerns in transportation decision-making throughout Missouri.
- Establish a process for meaningful public participation in transportation decision-making.

Policy Recommendations

Recommendation #1:

Establish an interagency process to coordinate the efforts of state agencies, transportation planning organizations and public transportation providers in transportation planning and decision-making.

- ✓ Support reauthorization of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) with its planning and program structure provisions.
- ✓ Establish, by Executive Order, an interagency transportation coordinating council within the Missouri Department of Transportation.

Recommendation #2:

Identify and implement the use of energy-related performance indicators to develop transportation programs for Missouri and require their use in the interagency coordination process.

- ✓ Identify and develop databases for energy-related transportation indicators.
- ✓ Develop energy-related transportation indicators.

Recommendation #3:

Establish uniform methods for determining the full public and private costs and benefits of proposed transportation investments.

- ✓ Analyze and communicate the full and life-cycle costs and benefits of alternative transportation strategies.

Recommendation #4:

Educate Missouri citizens regarding the opportunities and value of making energy-efficient transportation decisions.

- ✓ Improve the statewide network of public and private transportation information.
- ✓ Issue an annual report on the status of transportation systems in Missouri; this report shall be produced by MoDOT in cooperation with the Interagency Transportation Coordinating Council.

Recommendation #5:

Develop and implement guidelines to ensure public participation in transportation decisions.

- ✓ Support and enable the public's right to be fully informed of, and to influence, transportation choices.

Recommendation #6:

The state shall adopt and fund a comprehensive transportation policy that has as its objective improved public access to people, places, jobs, goods and services and that results in greater transportation energy efficiency.

- ✓ Support efficient multimodal transportation systems.
- ✓ Support transportation strategies.
- ✓ Develop funding mechanisms to support a comprehensive transportation system.

Summary of Policy Recommendations

Residential, Institutional, Commercial and Industrial Facilities

Introduction

Whether building a home, remodeling a business, purchasing a new appliance, or replacing a heating system, decisions can be made that save energy and money and reduce environmental impact in the long-term. However, the person making the decision does not always have time to become an energy expert, nor the means to compare the environmental impacts and costs — first costs, utility costs, maintenance costs and disposal costs — of each alternative.

By making information more available, people can address energy-efficiency concerns before the building is designed or constructed, when it is most economical, and can consider energy efficiency when buildings are renovated or when new equipment and appliances are purchased.

Along with saving both energy and money, wider use of efficient building technologies will reduce environmental impacts, offset the need for additional electric generating capacity and reduce national dependence on imported oil. Currently, residential and commercial buildings account for approximately one-third of all U.S. energy production.

After transportation, the second-largest user of energy in Missouri is the residential sector at 26 percent, followed by the industrial sector at 17 percent and the commercial sector at 16 percent. Much of the energy consumption in the residential and commercial sector is for space heating and cooling, water heating, lighting, and food storage. Using cost-effective energy technologies, energy consumption could be reduced significantly.

The average energy burden for low-income families is much greater than for families at the median income level. According to a 1995 National Consumer Law Center report, families receiving Aid to Families with Dependent Children (AFDC) paid an average 26 percent of their income toward energy, while median income families spent an average of less than 4 percent of their incomes on energy. The AFDC households had the lowest incomes and the highest energy burden of all segments of the low-income population studied. For single-elderly-poor and disabled people living on Social Security benefits, the average energy burden took more than 19 percent of their income.

Private sector and state government activities that affect the design and construction of new buildings and the operation of existing buildings range from collecting and disseminating information to financing of building energy-efficiency measures.

Summary of Policy Recommendations

This section presents a summary of residential, institutional, commercial and industrial facilities' policy recommendations. If adopted, these recommendations will promote diverse, competitive and affordable energy service choices that best contribute toward sustainable economic growth and environmental quality in Missouri. In addition, safe and reliable energy systems that improve human health and increase productivity will be promoted.

Goal

Provide the residential, commercial and industrial consumers of energy services for buildings in Missouri diverse, competitive and affordable choices that best contribute toward sustainable economic development and environmental quality; and maintain high standards for safety and reliability with energy systems that promote improved human health and increased productivity.

Objectives

- Encourage life-cycle costing when considering building design and operation.
- Support both educational efforts and mandates for energy efficiency in buildings.
- Support energy services for low-income households.

Policy Recommendations

Recommendation #1:

Missouri should adopt building codes based on life-cycle costing that establish cost-effective minimum energy-efficiency standards for new residential and commercial facilities.

- ✓ Adopt the ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers) 90.1-1989 energy code and subsequent upgrades as the minimum Missouri performance standard for commercial buildings.
- ✓ Adopt the CABO (Council of American Building Officials) Model Energy Code as the minimum Missouri performance standard for residential buildings.
- ✓ Develop and promote voluntary building standards for optimal energy performance.

Recommendation #2:

Apply life-cycle costing methodologies in state government in the design and/or retrofit of energy systems and buildings and share the lessons learned with other public and private organizations.

- ✓ Accelerate and expand implementation of the Energy Efficiency in State Facilities (EESF) program.

Recommendation #3:

Support the development and implementation of a Missouri Home Energy Rating System / Energy-efficiency Financing Program (HERS/EEF) as a market-based strategy to encourage energy savings and efficiency in the residential sector. Expand, if appropriate, to provide energy-efficiency financing options in the commercial and industrial sectors.

- ✓ MHDC, DNR-DE and EIERA shall promote residential energy-efficiency financing programs.
- ✓ Promote a voluntary energy rating analysis for all new residential construction and major renovations.
- ✓ Work with the financial community to realize the value of energy efficiency.
- ✓ Support energy-efficiency training for design, building, sales and financing professionals.
- ✓ Encourage the development of a program to conduct voluntary energy rating analysis and programs that finance the incremental first costs of energy efficiency for all new commercial construction and major renovations.

Recommendation # 4:

Build on the labeling provisions of the Energy Policy Act to support a voluntary national effort for improved energy-efficiency labeling of appliances.

- ✓ Promote voluntary high-efficiency technologies.

Summary of Policy Recommendations

Recommendation #5:

Support the development and coordination of state resources to assist low-income families in making their homes more energy efficient and in the purchase of energy for their homes.

- ✓ Require state agencies to coordinate activities to assist low-income households with energy affordability.
- ✓ Require cost-effective, energy-efficient design and construction for housing projects developed with federal or state funds.
- ✓ Support funding.
- ✓ Support energy-efficiency education for low-income families.

Recommendation #6:

Throughout the transition to a deregulated or less regulated power industry in Missouri and regionally, the state should act to protect the public interest.

- ✓ Minimize degradation of Missouri's environment attributable to energy production, distribution and use.
- ✓ Support informed consumer choice.
- ✓ Develop strategies that protect the interests of small consumers.

Summary of Policy Recommendations

Alternative- and Renewable- Energy Supplies

Introduction

The most significantly consumed forms of energy in Missouri are petroleum and petroleum-based products. As reported by the 1992 *Missouri Statewide Energy Study*, petroleum expenditures accounted for nearly 52 percent of 1990 Missouri energy expenditures.

Although in the future fossil fuels will continue to play an important role in supplying Missouri's energy needs, any strategy to reduce dependence on fossil fuels must begin by improving energy efficiency. But energy efficiency alone will not be enough. New energy sources will be needed to replace at least a portion of the fossil fuels we use.

Alternative and renewable fuels must play an increasing role in providing energy for Missouri's future and for the state's energy security. Approximately 8 percent of the national energy supply is provided by renewables, 46 percent of which is from hydropower. Besides hydropower, renewable-energy resources include solar, wind and geothermal energy; biomass resources such as forestry and crop waste; municipal solid waste; fuel ethanol; biodiesel; and methane gas from landfills and animal and municipal waste water treatment systems.

In addition to renewable fuels, Missouri must use other "alternative" transportation fuels, which burn cleaner and are more "secure" than traditional gasoline and diesel fuels. These fuels include natural gas, ethanol, biodiesel, methanol, propane and electricity.

Many Missourians are involved in activities that affect the current and future availability and affordability of alternative and renewable solid, liquid and gaseous fuel supplies. Private sector activities and those of other state governments include information collection and dissemination, building of infrastructure, and construction of facilities that will use these alternative and renewable fuels.

This section presents a summary of renewable- and alternative-energy supply policy recommendations. If adopted, these recommendations will nurture the development of sustainable alternative- and renewable-energy supplies and promote energy efficiency, energy security, economic development and environmental enhancement.

Goal

Develop alternative- and renewable-energy sources that improve Missouri's economic productivity and environment. The priority should focus on energy sources that originate in Missouri.

Objectives

- Create an environment in Missouri that nurtures the development of those alternative- and renewable-energy supplies that provide our state the greatest long-term competitive advantage, economically and environmentally.
- Improve the efficiency of fossil fuel use.
- Assess the relative practicality of alternative- and renewable-energy sources in our region, including consideration of life-cycle costs, macro-economic impacts and environmental concerns.
- Focus priority on energy sources that are indigenous to Missouri.

Policy Recommendations

Recommendation #1:

Purchase and use alternative and renewable motor-vehicle fuels in state government and share lessons learned with other public and private fleet managers.

- ✓ Raise the incremental cost allowance for alternative-fuel vehicles currently in state law (5 percent) to 12 percent in order to meet federally mandated alternative-fuel vehicle purchase requirements in state fleets.
- ✓ Support federal funding for alternative-fuel use.
- ✓ Create markets and infrastructure for alternative fuels.

Recommendation #2:

Increase domestic state energy production by increasing and/or optimizing the use of solar, wind, biomass, and alternative sources of power, and their supporting technologies, with first priority on Missouri resources where they provide the same or lower cost power.

- ✓ Support continued federal investment in renewable-energy research and development.

Summary of Policy Recommendations

- ✓ Support federal grants to states for technology transfer and commercialization.
- ✓ Adopt a state renewable-energy strategy.
- ✓ Adopt a state alternative-energy strategy.

Summary of Policy Recommendations

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Conclusion

If the state's economy, environment and population are to remain healthy, Missouri needs to look beyond today and plan ahead to meet the issues of tomorrow. The state should invest in cost-effective energy-efficiency measures in all modes of transport and in residential and commercial construction. We also must enhance the use of alternative and renewable forms of energy, and we must continue to educate the public about the benefits of such investment.

The issues addressed in this report clearly demonstrate that Missouri must focus on meeting the energy needs of the coming century. As with any journey, the process requires a map. By bringing together many people with sometimes differing interests, the Energy Futures Coalition developed such a map in this report.

On behalf of all Missourians, the Energy Futures Coalition encourages you to explore the possibilities with this report as a guide. It is up to all of us to continue the journey.

Summary of Policy Recommendations

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Policy Recommendations

**Policy
Recommendations
Part 1**

**Education,
Information,
Marketing and
Incentives**

Introduction

In a 1992 Department of Natural Resources marketing survey, when asked about state performance in natural resource policy areas, respondents indicated the state needed to increase activity in promoting alternative energy sources (65 percent), educating the public about energy conservation (57 percent), encouraging energy conservation and efficiency (54 percent), educating the public about environmental protection (56 percent) and promoting alternative transportation (50 percent). Missourians want reliable energy information to make informed decisions. Policymakers, in particular, need accurate, timely data and analysis.

The Coalition developed the following energy information and education recommendations to the Governor, drawing upon the expertise of environmental and energy professionals, the 1992 *Missouri Statewide Energy Study* and the HCR 16 report, *Economic Opportunities through Energy Efficiency and the Energy Policy Act of 1992*. A list of related state and federal policies supports each recommendation. Finally, the Coalition presents examples of current activities and further actions that could support adoption and implementation of its recommendations. If adopted, these recommendations will help improve Missouri's energy information base and increase accessibility to that information.

Goal

Provide timely, reliable energy information, and educate and raise the awareness of Missourians about energy efficiency and alternative consumer choices that provide a sound, clean environment and economic vitality.

Objectives

- Raise public energy awareness, and assure that Missouri citizens have timely access to reliable information about how energy choices are related to environmental and economic quality of life.
- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.
- Recognize outstanding achievements and develop other incentives that encourage voluntary advancement of energy efficiency, appropriate technology and renewable-energy resources in the state of Missouri.

Policy Recommendations

Recommendation #1:

Develop a coordinated, accessible public information network, linking data from diverse, reliable information resources. Include public access to information regarding current energy policy and economic, technical and consumer issues that originate from federal, state and public agencies, as well as the private sector.

- a. Recommended actions to facilitate the adoption of this policy recommendation.
 - ✓ **Create a public information service network to include the state's Energy Information Resource Center.** The Center serves the general public by providing rapid access to reliable consumer, technical, economic and policy information on energy supply, energy efficiency, renewable energy and other energy issues. Stable funding for this purpose should be established to protect public access to energy information.
 - ✓ **Select communication media to reach all population and organizational sectors.** Assess and encourage the best applications for print and graphic materials, voice, video and other electronic communications; teaching models and exhibits; and other proven and emerging information-dissemination and education methods. Assure that sight- or hearing-impaired individuals have access to information in a usable medium.
 - ✓ **Compile, create and disseminate quality consumer and technical energy information.** Encourage and support public- and privately sponsored local and regional projects that create and disseminate to the public quality, energy information for non-technical audiences.
 - ✓ **Expand the energy-related public information base by supporting quality economic, environmental and other energy-related data collection, analysis and reporting.** Facilitate public- and privately sponsored projects that undertake technical, economic and policy research, data collection, analysis and reporting. Use established, respected national and regional databases as a repository for Missouri data, and for retrieval of state, regional and national data and analyses. Support continued, adequate funding for the national Energy Information Administration (EIA).
- The EIA provides national, regional and state-specific data about energy price and expenditures, petroleum supply and consumption, historical electricity generation and consumption, natural gas production and usage, winter fuels production and usage, and production and consumption projections into the next decade.

Education, Information, Marketing and Incentives

✓ **Support energy-efficiency education for low-income families.** Establish a coordinated, interagency program to provide energy-efficiency education to low-income families. The program should include simple-to-use weatherization techniques and helpful lifestyle changes. It could be made available at Division of Family Services assistance centers and community action agencies.

b. Policy Initiatives

Missouri State Government

Governor Carnahan's Commission on Management and Productivity recommended that the state develop strategies to improve existing information technology and create a plan to establish an infrastructure that supports innovative management solutions. The Commission also recommended implementation of an ongoing strategic information technology planning process that addresses statewide acquisition, implementation and application of information technology.

State agencies are currently involved in developing strategic, information-technology systems that link and integrate information from various sources.

Federal/Other States

The Department of Energy (DOE) funded the Energy Extension Service (EES) program operated by the Division of Energy from 1980 through 1992. The DOE funds for this program were used to promote energy-conservation efforts through education and information. After 1992, the EES program funds were united under the State Energy Conservation Program (SECP) state plan with no funding directed towards education and information. Recently modified by the DOE, the SECP is now known as the State Energy Program (SEP). The Missouri SEP plan includes specific educational and informational program activities that address energy efficiency.

The Energy Information Agency, which currently faces a reduction in funding that threatens the agency's existence, is a primary resource for energy information for the nation and a vital information source for the state.

The National Governors' Association (NGA) supports a National Information Infrastructure that provides high-quality, reliable and affordable communication linkages next door and around the world. The NGA policy states that the infrastructure is essential to the economic competitiveness of the states and the nation, that it has the potential to improve the quality of life for all citizens, and that it can enhance the delivery of public services.

Education, Information, Marketing and Incentives

In 1996, the Department of Natural Resources completed a baseline inventory of 1990 greenhouse gas emissions in Missouri. This inventory identifies carbon dioxide from the combustion of fossil fuels as the primary greenhouse gas emission in Missouri.

Federal/Other States

(See Federal/Other States under policy recommendation #1, above.)

c. Supporting Programs and Projects

Missouri State Government Activities

★ A proposed “Missouri State Energy Indicators” project would draw on the mission of the Division of Energy, results from the Energy Futures Coalition, internal state energy policy planning, results of the greenhouse gas (Phase 1 and 2) projects, and other internal and external research efforts to define appropriate energy indicators and establish baseline statistics.

Missouri environmental indicators are currently an objective in the Department of Natural Resources’ draft strategic plan, and in the Division of Energy’s FY97-98 action plan. The project relies upon statewide participation, recognizing and staying consistent with regional and local indicator projects where they exist, and encouraging projects where they do not.

Missouri Private Sector Activities

★ Sustainable St. Louis is a community forum whose mission is to promote the sustainability, or long-term cultural, economic, environmental and social health of the greater St. Louis region. The forum assists citizens in creating a vision of the region’s long-term health, serving as an information clearinghouse, supporting local sustainability projects, and encouraging area decision-makers to make sustainability a goal.

★ Metro Dataline is an online community data resource for planners and researchers. It is a product of a partnership between the Mid-America Regional Council (MARC), the Greater Kansas City Community Foundation and Related Trusts, and the Midwest Research Institute (MRI). The Metro Dataline Vital Sign Indicators (VSI) data set allows access to information in the categories of Arts and Culture, Business/Economy, Education, Environment, Family Life, Health, Housing and Public Safety for Kansas City, Missouri.

Federal/Other States’ Activities

★ Many states including California, Illinois, Iowa, New Jersey, New York, Ohio, Oregon, Vermont, Washington and Wisconsin, and periodically develop and publish energy plans that define goals and indicate how progress on the goals is to be measured.

Recommendation #4:

Develop a decision-making process that assigns the responsibility for collecting, analyzing and applying new energy data into decision-making processes, building on such foundations as the 1992 energy study.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Designate the Department of Natural Resources in cooperation with the Office of Administration as coordinating agencies to promote state-regional intergovernmental decision-making on targeted energy issues.** According to the initiatives of the Governor's Council on Management and Productivity (COMAP), state and local agencies should recognize and coordinate to improve the quality of decisions and projects that have an impact on the amount and/or type of energy used, whenever public dollars are involved, through their strategic planning and budgeting processes.

The state should require early interagency coordination when decisions or projects are going to result in energy-related outcomes. (See Part III, Policy Recommendation #1, a., for an example of state agency coordination related to energy efficiency in state facilities.)

✓ **Establish a joint independent energy-efficiency technical assistance program between the Missouri Department of Transportation and the Missouri Department of Natural Resources.** Establish a cooperative technical assistance program for state departments, transportation planning organizations and public transportation providers to assist them in evaluating the energy efficiency of proposed transportation investments.

- b. Policy Initiatives

Missouri State Government

State agencies are currently involved in implementation of a strategic planning process that guides the state appropriation process.

Federal/Other States

(See Federal/Other States under policy recommendation #1, above.)

- c. Supporting Programs and Projects

Missouri State Government Activities

★ No known state government program or project activities.

Education, Information, Marketing and Incentives

Missouri Private Sector Activities

- ★ No known private sector program or project activities.

Federal/Other States' Activities

- ★ No known federal/other state program or project activities.

Recommendation #5:

Encourage the development of promotional programs for energy efficiency in both the public and private sectors.

a. Recommended actions to facilitate the adoption of this policy recommendation.

- ✓ **Establish Governor's Energy Award.** The Governor's Excellence in Energy Efficiency and Renewable Energy Achievement Award would recognize (1) innovative efforts and outstanding results from state intergovernmental cooperative projects, and (2) outstanding accomplishments in energy-efficiency, alternative-energy or renewable-energy applications. Nominate qualifying agencies and organizations for national recognition.
- ✓ **Include innovative and effective energy-efficiency promotional campaigns in recognition programs, for both public and private organizations.** The Governor's Awards program should include energy education in one or more categories, to stimulate creative approaches in public and private energy organizations. (See Part I., Policy Recommendation #1, Action Item #1 for additional information.)
- ✓ **Take advantage of state and national media interests to publicize energy's link with environmental and economic issues.** The link between state and national "hot issues" and energy can be used as a common theme to promote an awareness of energy efficiency.
- ✓ **Publicize outstanding local accomplishments.** Success stories that help transfer good ideas among organizations can be encouraged in the media and as a promotional piece by all energy organizations.
- ✓ **Use or commission quality public service announcements and other professional promotional campaign products from national organizations, for state cost-sharing on promotional/information development expenses.** Alliance to Save Energy, as an example, produces promotional materials such as television and radio spots sponsored by the Missouri Department of Natural Resources' Division of Energy in 1996. Not every campaign has to be invented locally.

Education, Information, Marketing and Incentives

b. Policy Initiatives

Missouri State Government

No known policy initiatives addressing this policy recommendation.

Federal/Other States

(See Federal/Other States under policy recommendation #1, above)

c. Supporting Programs or Projects

Missouri State Government Activities

★ The Missouri Department of Natural Resources' Division of Energy and the Alliance to Save Energy formed a partnership to promote energy-efficiency issues in Missouri through various media campaigns.

★ Each year, the Division of Energy actively promotes energy-efficiency strategies as part of the annual Missouri State Fair held at the Missouri State Fairgrounds in Sedalia, Missouri. Thousands of interested Missourians tour display booths provided by the division as well as the Environmental Improvement and Energy Resources Authority. The booths make available several energy-related publications while staff answer questions about energy and energy efficiency from the general public.

★ The Division of Energy provides a display booth at various events held throughout the state each year. Home shows, trade conventions and public schools often invite the division to participate at these events.

★ The Department of Natural Resources has a toll-free consumer hotline to respond to questions or inquiries made by the general public. The division receives approximately 50 requests a month for information addressing various topics of energy efficiency.

★ The Division of Energy provides several energy-related publications to interested Missourians promoting energy efficiency through a wide array of energy topics.

Missouri Private Sector Activities

★ Several Missouri energy utilities are actively promoting energy efficiency in both the private and public sectors. Union Electric company's award-winning school program, Kansas City Power and Light's home energy rating system promotion, the Columbia Water and Light Department's energy-efficiency promotional program and Springfield City Utilities' home audit program are just a few examples of these activities.

Education, Information, Marketing and Incentives

★ The Missouri Public Service division of UtiliCorp United has sponsored energy audits for large volume customers. These audits identified where energy was being used by the customer, and a final report was provided to the customer with recommendations on ways to modify or upgrade existing equipment for improved energy efficiency. Many of the customers took advantage of the program to install higher-efficiency lighting and manufacturing processes.

Federal/Other States' Activities

★ The National Association of State Energy Officials (NASEO) facilitates joint state efforts to develop awareness of available promotional opportunities. These include the Alliance to Save Energy's public service announcement for television and radio spots sponsored in key Missouri markets in association with the Missouri Department of Natural Resources' Division of Energy in 1996-1997.

★ The U.S. Department of Energy, Chicago Regional Support Office is developing regional and state objectives, which will be likely to include coordinated awareness activities on central energy themes.

★ Several states have established toll-free consumer hotlines and energy libraries to further promote energy efficiency.

**Policy
Recommendations
Part 2**

Transportation

Introduction

For Missouri, the transportation sector is the largest consumer of energy. The 1992 *Missouri Statewide Energy Study* estimated transportation's share of all energy used in Missouri at 41 percent in 1990.

In Missouri, there are as many motor vehicles registered as there are people. Motor vehicles, and particularly the automobile, represent the single largest mode of transportation in the state. Missourians drive their cars an estimated 57 billion miles per year. Nationally, household vehicle miles traveled increased 82 percent between 1969 and 1990 while total population grew only 21 percent.

During 1990, the state's energy expenditures totaled approximately \$9.7 billion, with transportation expenditures accounting for \$4 billion. Of the available transportation fuels, virtually all of which are imported, petroleum represented the largest source.

The volume of wholesale motor fuel imported from outside Missouri, including all gasoline, diesel fuel and gasohol, amounted to more than 2 billion gallons.

The state's per capita use of transportation energy is higher than the U.S. average, partly because the state has more licensed drivers per capita than the nation as a whole (69 percent of the state population compared to 67 percent for the United States).

Comparing transportation efficiencies reveals an even more important factor. Although the United States had a 1990 average automobile fuel efficiency of 21 miles per gallon (m.p.g.), Missouri's average was only 19 m.p.g. The state's m.p.g. rating for its entire fleet of cars, trucks and buses was also well below the U.S. average of 17 m.p.g.

Missouri is involved in several activities that affect the current and future availability and affordability of our transportation system. This section presents a summary of transportation policy recommendations. If adopted, these recommendations will help promote transportation energy efficiency, educate and encourage Missouri citizens to be involved in transportation decisions, and provide greater mobility for all people.

Goal

Improve Missouri's economic productivity by (1) establishing a decision-making process for transportation-related investments by the State of Missouri, metropolitan planning organizations and public transportation providers — taking into account the total cost-effectiveness of the proposed investment, including all costs and benefits across all modes and fuels — and by (2) promoting energy-efficient transportation decisions by the private sector and citizens of Missouri.

Objectives

- Coordinate the efforts of state agencies, transportation-planning organizations and public-transportation providers in transportation planning and decision-making.
- Identify performance indicators, set up required data collection processes to track the indicators and develop goals.
- Establish uniform methods for determining the full costs and benefits of proposed transportation investments.
- Take advantage of opportunities for creating an awareness of energy-efficiency concerns in transportation decision-making throughout Missouri.
- Establish a process for meaningful public participation in transportation decision-making.

Policy Recommendations

Recommendation #1:

Establish an interagency process to coordinate the efforts of state agencies, transportation-planning organizations and public-transportation providers in transportation planning and decision-making.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Support reauthorization of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) with its planning and program structure provisions.** The federal Intermodal Surface Transportation Efficiency Act (ISTEA) expires September 30, 1997. Missouri should support reauthorization and take advantage of its provisions to support development of a comprehensive, integrated transportation-planning infrastructure.

✓ **Establish, by Executive Order, an interagency transportation coordinating council within the Missouri Department of Transportation.** The purpose of the coordinating council is to correct inefficiencies in transportation planning that at present result in waste of public resources, inadequate understanding and consideration of public concerns and needs, and poor state, regional and local public-transportation system connectivity. The council should include representation by key personnel from other executive departments including the Office of Administration, the Department of Social Services, the Department of Natural Resources and the Department of Economic Development. The council will achieve its objectives by developing and overseeing early, consistent coordination and reconciliation of transportation plans and project management activities among state, regional and local public-transportation planners and providers, and by assuring meaningful interaction with key public and private constituencies.

- b. Policy Initiatives

Missouri State Government

The Missouri Department of Transportation initiated a public-involvement process in 1993-94 for the development of its *Show-Me Transportation: Missouri's Long Range Transportation Plan* for the state, which involved local transportation planners, transportation service providers and interested stakeholders. The long-range plan was adopted by the Missouri Highways and Transportation Commission in January 1995.

The report of the legislative interim committee on the Department of Transportation in the fall of 1995 recommended that the Department of Transportation "should work with other

state agencies, the federal government and local agencies to coordinate public transportation, particularly to senior citizens, people with disabilities, children, and Medicaid and welfare recipients.”

In the Spring of 1996, the East-West Gateway Coordinating Council and the Missouri Department of Transportation initiated a Memorandum of Understanding in an effort to create a transportation planning partnership for the St. Louis region. East-West Gateway Coordinating Council is the St. Louis area's metropolitan planning organization and council of governments representing local governments on transportation policy and planning strategies. Mutually adopted by the Missouri Highway and Transportation Commission and the East-West Gateway Coordinating Council's Board of Directors, the formal agreement identifies the respective responsibilities of each organization and future transportation-planning activities.

On July 15, 1996, the Governor named a special Total Transportation Commission to study Missouri's transportation needs and examine how the state's modes of transportation should be integrated. The Commission's recommendations are being developed in parallel with the transportation recommendations of the Coalition.

Federal/Other States

The federal Intermodal Surface Transportation Efficiency Act of 1991 provides more funding flexibility and local involvement in the public policy process, with greater control at the local level to allow states to choose transportation alternatives that meet their individual needs.

c. Supporting Programs and Projects

Missouri State Government Activities

★ In 1992, the Environmental Improvement and Energy Resources Authority released the *Missouri Statewide Energy Study*. The *Study* was the product of a comprehensive evaluation and planning process that addresses the environmental, economic and energy-related needs and issues of all energy end-use sectors in the state and suggests implementation activities for everyone from individuals to Missouri business and government.

The *Study* continues to provide a strong foundation toward the development of a comprehensive energy policy for Missouri and serves as a vital link between the Missouri Legislature, various Executive Departments, planning organizations and interested constituents.

■ The EIERA also has participated actively with other agencies in the development of the Missouri Department of Transportation's *Show-Me Transportation*, the state's long-range transportation plan. The EIERA attended and offered relevant information during the Environmental Focus Group process, contributing new perspectives and insights to the plan development process.

The EIERA has also worked with other government organizations and educational institutions to help promote alternative modes of transportation in Missouri. Recently, the EIERA provided funding assistance to Crowder College in Neosho, Missouri, to demonstrate the feasibility of electric cars powered by solar energy.

Missouri Private Sector Activities

★ The metropolitan planning provisions of ISTEA feature an enhanced role for local governments. Metropolitan planning organizations are responsible for developing, in cooperation with the state and affected transit operators, a long-range transportation plan and a transportation-improvement program for the area. Examples of such planning and coordination efforts include the following:

■ The East-West Gateway Coordinating Council, St. Louis, Missouri, is working extensively with various federal, state and local agencies to promote the development of a comprehensive transportation-policy planning process for the bi-state area.

The development of *Transportation Redefined*, the St. Louis area long-range transportation plan, began in the fall of 1992 with a large regional conference. *Transportation Redefined* was adopted by the East-West Gateway Coordinating Council's Board of Directors in September 1994 and serves as a strategic platform for the ongoing development of the St. Louis area's transportation-policy planning process.

■ The East-West Gateway Coordinating Council is currently involved in several cooperative transportation-policy and planning issues. The council is working with a wide array of public agencies at the federal, state and local level to support the St. Louis Regional Clean Cities Program. Due to the success of this program, St. Louis became the 29th community to receive a Clean Cities designation from the U.S. Department of Energy on November 18, 1994.

The St. Louis Clean Cities Program was initiated by the East-West Gateway Coordinating Council in January 1994 to facilitate local participation in the National Clean Cities program. The St. Louis program is a voluntary coalition of public and private organizations that operate vehicle fleets in the St. Louis region or are part of the vehicle or fuel industries serving them. These organizations are working together

to expand the use of alternative transportation fuels in the St. Louis region toward achieving clean air, energy independence and economic development goals.

Participants in the St. Louis Clean Cities program include the City of St. Louis, Missouri; St. Charles County; St. Louis County; Franklin County; Jefferson County; and the Illinois counties of Madison, St. Clair and Monroe.

■ Kansas City's Metropolitan Energy Center (MEC) has, for nearly two decades, worked across several governmental jurisdictions to help develop a long-term policy and planning infrastructure addressing several community-based issues including transportation services.

The MEC participated in the development of the Missouri Department of Transportation's (MoDOT) *Show-Me Transportation* long-term transportation-policy planning process by encouraging various organizations and individuals to attend and take part in the Focus Group meetings hosted by the MoDOT. The MEC also provided direct input in the development of the long-range plan, including vital transportation-related information from the 1992 *Missouri Statewide Energy Study*, which the MEC helped to develop.

■ Mid-America Regional Council (MARC), Kansas City's area metropolitan planning organization, is currently addressing various transportation-related policy and planning strategies. MARC represents Kansas City area local governments and provides a common link in the development of community-based policies and programs. MARC and MEC jointly have addressed various transportation policy and project development activities. Examples include Kansas City's vanpool and rideshare program, the feasibility of a light rail service for metropolitan Kansas City, regional transportation-planning efforts and the development of programs to improve Kansas City's air quality.

MARC is currently designing a comprehensive air-quality strategy with a wide variety of groups to determine the best steps to clean up Kansas City's air. Last summers' exceedances of the federal ozone standard caused MARC to consider a variety of options from transit to vehicle inspections to less-polluting fuels. These strategies are all aimed at reducing pollutants in the atmosphere, making the air cleaner to breathe.

■ The Sierra Club, a nationally recognized advocacy group, also has been actively involved in transportation policy and planning. Through consumer education forums, the public hearing process and legislative involvement, the Sierra Club has striven to influence transportation policy in Missouri.

■ Citizens for Modern Transit in St. Louis, Missouri, a regional transportation-policy and planning advocacy organization, is also active in influencing transportation policy in Missouri. This is accomplished through citizen-awareness programs, participation in policy-development issues including state and local legislation and Missouri's *Show-Me Transportation* plan, as well as participation in regional transportation planning.

Federal/Other States' Activities

★ Passage of the National Highway System Act by Congress during 1995 provides Missouri with federal highway funding. Federal transportation appropriations for this fiscal year resulted in a reduction of approximately \$24 million from last fiscal year. The annual level of federal funding continues to be of great concern to the Missouri Department of Transportation in light of the congressional goals of reducing federal spending and balancing the federal budget.

★ The federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) required states to re-examine their transportation systems and plans, and develop comprehensive new plans for the future.

The ISTEA emphasizes a systems or holistic approach to transportation planning, which expands the concept of system performance to include mobility and access, equity, reliability and external impacts, and which requires cooperative planning by local and state governments.

The metropolitan planning provisions of the ISTEA feature an enhanced role for local governments. The metropolitan planning organization (MPO) is responsible for developing, in cooperation with the State and affected transit operators, a long-range transportation plan and a transportation improvement program (TIP) for the area. The TIP must be consistent with the plan and must include all projects in the metropolitan area proposed for federal funding assistance.

The planning process must include additional considerations such as land use, intermodal connectivity, methods to enhance transit service, and needs identified through the management systems.

Through ISTEA, states develop statewide multimodal transportation plans. These plans examine the transportation needs within broad corridors, and the right solution or combination of solutions to address them. Highways, airports, railroads, harbors and transit systems are part of the mix, with different solutions applied appropriately in different areas. ISTEA also provides the flexibility to spend highway funds on alternative modes, such as transit. The key is to find where these alternatives are feasible and make sense.

ISTEA starts with a blank slate. States' existing highway, rail and airport plans are reviewed and, where plausible, recommendations for change are offered. New plans for intercity bus, urban mass transit, bikeways, and intercity freight and passenger rail may be developed.

Federal law requires all federally funded urban transportation projects to be included in urban transportation plans, developed by the state's metropolitan planning organizations (MPOs) in cooperation with their state's department of transportation. Planning determines the transportation future of urban areas and the economic development and environmental quality that depend upon it.

★ Coordination and cooperation between government agencies, the private sector and public citizens are imperative to meet the challenges of providing a statewide, multimodal transportation network. When the actions of one jurisdiction impact another or the public, there must be a process for coordination, planning and decision-making. Although ISTEA requires all states to address this comprehensive transportation-planning process, examples of states addressing this issue include the following:

■ The State of Washington has adopted a comprehensive statewide transportation-planning policy: "Establish a statewide transportation planning process to coordinate transportation planning between jurisdictions. This process should be flexible to allow for regional differences. Transportation planning and investments must be coordinated with land use and economic development decisions."

The State of Washington also has adopted a policy promoting public-private partnerships for transportation policy: "Washington state should formalize and expand its leadership role in promoting public-private partnerships at every government level to minimize legal and regulatory barriers to private participation in owning, planning, financing, building, maintaining and managing transportation facilities and services; encourage state and local governments to remove barriers to private investment in transportation; continue efforts to increase private sector involvement in transportation where it is practical and in the public interest; and encourage public-private initiatives for financing transportation facilities and operations."

In Washington State, public sector jurisdictions and the private sector work continuously to coordinate the development of transportation facilities, programs and services to provide a well-connected, seamless system.

■ Wisconsin's citizens, local government officials, legislators, statewide organizations, business leaders and environmental groups are helping the Wisconsin (WisDot) Department of Transportation find the transportation systems the state needs and how they should be integrated to move people and goods efficiently, support the economy, protect the environment and maintain the quality of life in the 21st century through a new statewide planning process called Translinks 21.

Translinks 21 is a 25-year plan that proposes programs and funding for state and local highways, railroads, transit, airports, harbors, intercity bus and bicycles to the year 2000. Under the ISTEA, Wisconsin's 11 metropolitan planning organizations (MPOs) are responsible for developing the multimodal transportation plans for their transportation areas.

Under Translinks 21, WisDOT will provide MPOs with planning guidance and technical assistance in about 20 different areas, including bicycle/pedestrian facility planning, land-use transportation planning, transit planning, travel demand-management strategies, environmental evaluations, management of access to highways and achievement of connections between various transportation modes.

WisDOT will also work with local officials to help identify mobility needs and develop transportation plans in the state's smaller urban areas.

■ The Illinois Department of Transportation (IDOT) has responsibility for planning, construction and maintenance of Illinois' extensive transportation network, which encompasses highways and bridges, airports, public transit, rail freight and rail passenger systems.

Goals of the IDOT are to follow a comprehensive transportation-planning process; promote coordination among public and private operators of transportation systems; support efforts to provide stable funding for the public component of the transportation system; and ensure a compatible interface of the transportation system with environmental, social and energy goals.

The IDOT develops multi-year transportation programs that identify specific improvement projects along with funding and a schedule for implementation. The multi-year highway programs are based on investment strategies developed to implement the policies and goals stated in the *Illinois State Transportation Plan*. The highway programs also are developed with input and information from current needs assessments, metropolitan planning organizations, public involvement, the Governor, the General Assembly and local officials.

■ Throughout the planning, design and construction phases of a transportation-related project, the California State Department of Transportation (Caltrans) utilizes a Memorandum of Understanding to reach conceptual agreement on project scope, funding, staffing and process. This unique formal arrangement among project participants clearly identifies the roles and responsibilities of each public agency, metropolitan planning organization and other transportation-related organizations and enhances the cooperative planning process to see the project to a successful conclusion.

Caltrans' Office of Project Planning and Design also provides greater transportation-planning coordination by developing and maintaining design standards, policies, procedures and practices used statewide for project planning.

Recommendation #2:

Identify and implement the use of energy-related performance indicators to develop transportation programs for Missouri and require their use in the interagency coordination process.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Identify and develop databases for energy-related transportation indicators.** The Missouri Department of Natural Resources, the Missouri Department of Transportation, the Office of Administration and metropolitan planning organizations should initiate a cooperative effort to identify available databases and other data sources needed for the development of energy-related transportation indicators.

✓ **Develop energy-related transportation indicators.** When a transportation plan is developed, it should include energy-related transportation indicators. The state should develop and report regularly on the status of Missouri's economic, environmental and social issues, using indicators influenced by energy-related transportation decisions. The Missouri Department of Natural Resources and the Missouri Department of Transportation jointly should establish statewide energy-related transportation performance indicators that are of interest to the general public, informed by local indicators projects and used in the interagency coordination process.

- b. Policy Initiatives

Missouri State Government

Show-Me Transportation: Missouri's Long Range Transportation Plan (1995) relies on the development of reliable databases and related performance indicators to determine the effectiveness of programs and projects developed under this strategy.

The Missouri Department of Natural Resources' Division of Energy recently completed the first phase of its Greenhouse Gas Emissions inventory project, which now is entering its second phase to develop strategies and recommendations to reduce greenhouse gas emissions in Missouri. The forthcoming proposals may provide the foundation by which Missouri state government develops future greenhouse gas and related environmental policies and actions.

Federal/Other States

The federal Intermodal Surface Transportation Efficiency Act of 1991 requires states and metropolitan planning organizations to include performance measures and performance monitoring.

In addition, the Act emphasizes a systems, or holistic, approach to transportation planning that expands the concept of system performance to include mobility and access, equity, reliability and external impacts, and that requires cooperative planning by local and state governments.

c. Supporting Programs and Projects

Missouri State Government Activities

★ During public hearings held before the Missouri Highway and Transportation Commission November 8, 1991, in Clayton, Missouri, the Ozark Chapter of the Sierra Club offered a recommendation to the proposed *Total Transportation Plan*, which included the selection of performance measures, including those of availability and accessibility, to be used in the plan. For example, the number of Missouri citizens who live within five miles of twice-daily, inter-city bus or rail service, or the number who live within a half-mile of hourly local public transit, may be more important than how many buses or how many route miles are operated.

★ The Missouri Department of Transportation has established a preliminary database using a variety of energy-related indicators. Some basic correlations and trend analyses have been completed by the department.

★ The Missouri Department of Transportation's *1995 Annual Progress Review of Missouri Road and Bridge Development Program* reported that performance measures to assess progress on transportation improvements and other department operations were being developed, and the process would be implemented through all department operations.

Missouri Private Sector Activities

★ Various transportation-related industries currently report vital statistics and information to industry associations and private organizations. These organizations and associations perform market analysis, cost/benefit analysis, investigate research and development opportunities, and evaluate investment scenarios and other industry-based examinations. A wealth of information exists in the private sector, usually for a nominal fee.

★ A new organization, Sustainable St. Louis, is working on a set of environmental and economic indicators that will help measure progress toward sustainable development in St. Louis.

Federal/Other States' Activities

★ The U.S. DOE's Energy Information Administration; U.S. Department of Transportation, Federal Highway Administration; Oak Ridge National Laboratories; and the U.S. Department of Commerce, Economics and Statistics Administration, Bureau of the Census are just a few examples of sources of vital energy information and data systems that can help support the management of energy-based performance indicators. Various federal agencies currently perform trend analysis of various energy-related databases to determine relationships between various energy, economic and environmental variables. Such analyses are available to the public.

★ In recent years, private organizations and government agencies have used "green indexes" or lists of indicators to report to the public on the status of energy, transportation and environmental issues. One influential report was the *1991-1992 Green Index: A State-by-State Guide to the Nation's Environmental Health*. This report included indicators on energy and transportation such as gasoline use per capita, miles per gallon of gasoline consumed, persons per motor vehicle, cars per transit bus, mass transit spending as a percent of highway spending, and mass transit use in urban areas. In 1993 and 1994, the World Resources Institute published the "Green Metro Index" on 75 U.S. metropolitan areas that included energy and transportation indicators.

Some community groups are also developing environmental indicators projects such as Sustainable Seattle, and the Community Environmental Council (Santa Barbara, Calif.). Many states also are developing green indexes or environmental indicators (often in the form of a "state of the environment" report, a "benchmarks" report or "milestone" report) including California, Colorado, Connecticut, Florida, Illinois, Kentucky, Maine, Massachusetts, Minnesota, North Carolina, Oregon, Tennessee, Utah and Vermont. For example:

■ The State of Kentucky identified various Energy Consumption Indicators and used the information to inform its citizens about the energy characteristics of the state.

One informative energy-related performance indicator was the "Modes of Transportation to Work in Kentucky," which compared various modes of transportation per 1,000 citizens from 1970 to 1990. From this use of energy-related performance indicators, it was found that, despite some efforts to encourage car pooling, most Kentuckians drive alone to work. The number of people using personal vehicles for work-related transportation increased by 64 percent from 1970

to 1990. The indicators used reflected the growing number of women in the work force and rural citizens who commute to urban areas. From the analysis, it was also determined that car pooling became popular in the 1970s due to a sharp rise in gasoline prices and federal and state incentives to encourage ride-sharing. However, funding cuts in energy-conservation programs during the 1980s stabilized gasoline prices, and an increase in the number of Kentuckians with automobiles likely resulted in the decline in car pooling as well as in use of public transportation.

★ A recent research effort by the National Consumer Law Center in 1995 examined transportation access and costs of low-income households in the United States. The study concluded that the issue of equity for low-income households is an important component in both transportation planning and pollution-prevention activities.

Recommendation # 3:

Establish uniform methods for determining the full public and private costs and benefits of proposed transportation investments.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Analyze and communicate the full and life-cycle costs and benefits of alternative transportation strategies.** The Missouri Department of Transportation and other transportation decision-makers should research and apply the best available methods to analyze and communicate the complete costs and benefits of alternative transportation strategies involving expenditures of public funds.

- b. Policy Initiatives

Missouri State Government

No known policy initiatives addressing this recommendation.

Federal/Other States

The Washington State Legislature in 1994 enacted legislation that requires regional transportation-planning organizations to use a least-cost planning methodology in formulating their regional transportation plans. The methodology must identify the most cost-effective facilities, services and programs.

Similar legislation was considered by the Wisconsin Legislature. The Wisconsin bill would have required the state department of transportation to develop a statewide transportation plan that assesses, in a least-cost integrated manner, the benefits and costs of all reasonable

options for supplying facilities and managing the demand for the movement of people and goods. Under this legislation, costs and benefits would include public safety and environmental benefits and costs as they apply to the public and to private persons.

c. **Supporting Programs or Projects**

Missouri State Government Activities

★ The Missouri Office of Administration, in cooperation with the Missouri Department of Natural Resources' Division of Energy, currently is using life-cycle costing methods to determine the full costs and benefits of using alternative transportation fuels in its public fleet program as mandated by House Bill 45, which addresses fuel-conservation programs and alternative transportation fuels.

★ The Missouri Department of Transportation uses an extensive benefit-to-cost analysis for the purchase of alternative transportation fuel technology as well as alternative transportation fuels used in its public fleet.

Missouri Private Sector Activities

★ East-West Gateway Coordinating Council, the St. Louis area's metropolitan planning organization, recently issued *Transportation Redefined*. This long-range transportation plan includes among its goals and objectives an effort to implement a coordinated planning process that reflects the full benefits or costs of transportation projects using analyses such as life-cycle costing and full-cost accounting. Such efforts are used in program and project development.

Federal/Other States' Activities

★ Washington state has a public-private partnership approach for freight-transportation infrastructure investments. Direct and indirect costs and benefits are considered in developing ways to finance investments.

★ To facilitate methods for determining the full costs and benefits of proposed transportation investments, the Pennsylvania Department of Transportation has established specific guidelines on identifying Major Metropolitan Transportation Investments (MMTIs) and for conducting Major Investment Studies (MISs). The guidelines were developed in response to the Metropolitan Planning Final Rules — jointly issued by the Federal Highway Administration (FHA) and Federal Transit Administration (FTA) — which became effective on November 29, 1993, and are the result of a cooperative effort of the PDT, FHA, FTA, the Pennsylvania Turnpike Authority, and Pennsylvania MPOs and transit authorities.

★ The San Francisco Bay Area Metropolitan Transportation Commission has adopted a multimodal method of project selection for its Surface Transportation Program (STP) and Congestion Mitigation and Air Quality Improvement Program (CMAQ). This process establishes a method of evaluating projects by utilizing a selection criteria founded on the 15 factors offered by the Intermodal Surface Transportation Efficiency Act as well as three additional factors: implementation of the Federal Clean Air Act, implementation of the Americans with Disabilities Act and improved system safety.

Newly established scoring criteria now use an "external impacts" category and are a method of taking into account many of the new mandates of the ISTEA such as considerations of land use, the Clean Air Act and the ADA.

Recommendation #4:

Educate Missouri citizens regarding the opportunities and value of making energy-efficient transportation decisions.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Improve the statewide network of public and private transportation information.** The public needs timely consumer and technical information on transportation options and costs in order to make informed daily and long-term choices. An effective information network could include an expanded Missouri Department of Transportation Customer Service Center, information posted on the Internet and centrally located public-information kiosks, local and state energy-information resource centers, and others.

✓ **Issue an annual report on the status of transportation systems in Missouri; this report shall be produced by MoDOT in cooperation with the Interagency Transportation Coordinating Council.** The state should compile and issue an annual interagency report to the public on the status of transportation, focusing on the energy-related transportation indicators developed under Policy Recommendation #2 above, or could incorporate transportation as a separate and significant section of a related annual energy-related indicators report. Drawing from information presented by state, regional and local transportation agencies and advocacy groups, the report is a vehicle for informing Missourians about the implications of transportation-related decisions in terms of key environmental, economic and social indicators that are dependent on those decisions, and of all the opportunities Missourians have to influence those decisions.

b. Policy Initiatives

Missouri State Government

The Department of Natural Resources' Division of Energy provides technical and financial assistance and information to encourage energy-efficient transportation decisions. Statewide fuel-pricing surveys are of particular interest to the public.

Federal/Other States

An informed citizenry is key to ISTEA's emphasis on public involvement and moving the nation toward a participatory model of transportation decision-making.

c. Supporting Programs and Projects

Missouri State Government Activities

★ The Missouri Department of Transportation has established a series of Customer Service Centers, which serve as a central contact for area customers in need of transportation-related information from the department.

The original concept of this project was to collect customer inquiries or data and log it into a database so it could be used in making decisions on future projects, department policy, improvements and legal matters.

The Customer Service Center now provides assistance to Missouri citizens with transportation-related inquiries and comments. The goal of the Center is to provide a timely response to customer requests.

Missouri Private Sector Activities

★ Several consumer advocacy groups, citizen action groups, environmental organizations and others are actively involved with consumer education efforts. These organizations use a variety of mechanisms to educate consumers on the importance of energy-efficient transportation decisions.

★ The U.S. Environmental Protection Agency publishes, and the Missouri Automobile Dealers Association and their retail representatives are required to make available, fuel cost comparisons for new automobile purchases, average fuel-economy ratings for these automobiles and the methodology used in obtaining these figures.

★ Various private-sector organizations such as petroleum marketers and the Missouri Oil Council, as well as industry-based organizations such as the Center for Energy & Economic

Development, provide information to the public regarding the use of traditional fossil fuels in the transportation end-use sector.

Federal/Other States' Activities

★ The Surface Transportation Policy Project (STPP) recently kicked off the Campaign for Reliable Transportation. The Campaign started March 19, 1996, with a citizen hearing on Capitol Hill in Washington, D.C.

The STPP campaign is based on this principal: Transportation options that offer real choices and local control will save consumers money and ensure reliable, affordable transportation for everyone. The campaign is aimed at ensuring that all people have the opportunity to choose the form of transportation they want and to make cost-effective investments in affordable transportation systems.

★ The federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) places a new emphasis on urban transportation. Urban areas face unique challenges such as traffic congestion, air quality limitations and connecting people with jobs. Land use is also a growing concern, as more development moves to suburban and outlying areas served by automobiles and to areas efficiently reached by transit walking or biking. Some examples of responses to these issues are as follows:

- Washington state is assisting its citizens to become aware of the opportunities and value of making energy-efficient transportation decisions by requiring transportation agencies to encourage the use of telecommunication technologies for telecommuting and appropriately-taxed teleshopping and videoconferencing as alternatives to vehicle travel.

Washington state is also offering multimodal choices to its consumers. All Washington citizens have access through federal, state, local or private programs to at least three transportation modes.

Additionally, improvements and expansion of multimodal choices, beyond roadway connections and public transportation options, in Washington state are being targeted in high-use transportation corridors and high-density areas. Linking land use to transportation services, such as concentrating employment in areas that have multimodal choices, are being encouraged.

At intermodal terminals, including airports, ferry, rail and major bus terminals, some level of transportation service brokerage, ranging from information kiosks to on-line public transportation information systems, are available. The type of transportation service brokerage is appropriately designed to the passenger travel markets and level of demand served by the intermodal terminal.

Washington state is identifying environmental protection and energy conservation opportunities to promote citizen education. Measures to protect, restore and enhance the environment are integrated into the planning, construction, operation and maintenance of the transportation system. Washington has adopted goals to design new, and improve existing, transportation systems that avoid the disruption and degradation of the natural environment and heritage resources, and that are aesthetically pleasing and energy-efficient, conserve scarce resources, and reduce pollutants from transportation systems.

■ California's PATH (Partners for Advanced Transit and Highways) program offers an alternative means to educate citizens regarding the opportunities and value of making energy-efficient transportation decisions.

The purpose of PATH is to develop the foundations for the widespread adoption of advanced technologies that will help improve the operation of California's surface transportation systems. This purpose is achieved through leading-edge research, evaluating operational tests, developing public/private/academic partnerships and educating both students and practitioners about Intelligent Transportation Systems.

■ In response to opportunities offered by the Intermodal Surface Transportation Efficiency Act of 1991, Virginia Citizen Action provides in-depth information to Virginia constituents on regional and national transportation issues and their implications to the local community.

Recommendation #5:

Develop and implement guidelines to ensure public participation in transportation decisions.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Support and enable the public's right to be fully informed of, and to influence, its public transportation choices.** Adopt and implement, on a continuing basis, public participation policies to improve public awareness, knowledge, involvement and effective influence on how public funds are invested. These actions would develop transportation systems that result in greater energy efficiencies. Adopting the policies recognizes that system design and construction decisions profoundly and irrevocably affect community and individual quality of life, and the quality of life for future generations, in direct and indirect ways.

b. Policy Initiatives

Missouri State Government

The Report of the Interim Committee on the Department of Transportation: Final Report and Recommendations, Fall, 1995 presents two related recommendations:

- “The Missouri Highway and Transportation Department (recently renamed ‘Missouri Department of Transportation’) and the Missouri Highway and Transportation Commission should continue to be responsive to local planning agencies and the general public.”
- “The Missouri Highway and Transportation Department (recently renamed ‘Missouri Department of Transportation’) and the Missouri Highway and Transportation Commission should actively provide information to local governments, political subdivisions and the general public about self-funding opportunities available for all modes of transportation (transportation districts, transportation authorities and transportation corporations).”

The Department of Transportation initiated a public involvement process in 1993-94 for the development of its long-range transportation plan for the state of Missouri that involved local transportation planners and providers.

Show-Me Transportation: Strategies for Action into the 21st Century, the Missouri Department of Transportation's Long-Term Plan, was the culmination of a transportation-policy planning process with the participation of more than 1,500 Missourians attending more than 53 statewide public meetings. The plan's vision is to proactively involve its customers from both the private and public sectors in the transportation decision process.

The MoDOT 1994 *Action Plan* called for obtaining more public opinion on programs and getting customer feedback on the department's total performance. The department's corridor location process incorporates public involvement in all phases of project development.

Federal/Other States

ISTEA requires public participation throughout the transportation-planning process.

c. Supporting Programs or Projects

Missouri State Government Activities

★ *Show-Me Transportation: Strategies for Action into the 21st Century*, the Missouri Department of Transportation's Long-Term Plan, was the culmination of a transportation-

policy planning process with the participation of more than 1,500 Missourians attending more than 53 statewide public meetings.

The plan's vision is to proactively involve its customers from both the private and public sectors in the transportation decision process.

★ The MoDOT 1994 *Action Plan* called for obtaining more public opinion on programs and getting customer feedback on the department's total performance. The department's corridor location process incorporates extensive use of public involvement in all phases of project development.

The MoDOT has also reorganized to provide focus on its customers. A key component of this effort is formation of the Plan Scoping Division. This division will focus on needs, not projects and dollars. The process also crosses many division lines to ensure customer input is gathered on a regional basis and needs are put in priority order. The new process is being implemented in several department districts. Future reorganization will be based on experience gained through implementation.

Missouri Private Sector Activities

★ Missouri private-sector organizations have established and use guidelines to encourage public participation in public-policy issues.

Organizations such as the Metropolitan Energy Center, the Sierra Club, local chambers of commerce, special needs groups and highway interests have all offered comments to the Missouri Department of Transportation during the development of the Missouri Show-Me long-range planning process.

★ In line with the requirements of ISTEA, metropolitan planning organizations such as the East-West Gateway Coordinating Council and Mid-America Regional Council are heavily involved in implementing public-participation strategies in transportation decision-making.

Federal/Other States' Activities

★ The federal Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) brings many new stakeholders into the transportation decision-making process. Environmentalists, bicycle and rail advocates, and the elderly and disabled join local officials, road interests, transit providers and business groups in having input into transportation plan development.

★ The public participation process emphasized by the ISTEA has been implemented by all states. The following are just a few examples of the types of activities that have taken place since its implementation:

■ Washington State has improved access to transportation decision-making by its policy adoption: "Transportation agencies should use evolving state-of-the-art telecommunications applications to improve citizen access to transportation decision-making processes and to enhance internal and interagency communications on transportation policy and planning issues."

■ Wisconsin's Translinks 21 is deeply grounded in public participation. The Wisconsin Department of Transportation (WisDOT) has initiated a series of newsletters that update Translinks 21 developments and explain the process.

WisDOT conducts a series of regional forums throughout the state, in partnership with Regional Planning Commissions. These half-day forums bring local government officials, business leaders, transportation interests, environmental and community groups together at the same table, to start building the Translinks 21 plan. At these forums, WisDOT presents an overview of what Translinks 21 is and what it will examine, how it will produce the perceived needs and priorities of each region, and how the public will be involved. More importantly, forum participants share their transportation needs and suggestions with WisDOT officials in a variety of "give-and-take" formats.

Along with regional forums, Wisconsin's public outreach and public participation process includes periodic meetings between WisDOT officials and key statewide organizations with an interest in transportation, along with visits to key communities statewide. Topical forums, focusing on urban, rural, economic development, freight, transit, tourism and environmental issues, are also held.

■ The Illinois Department of Transportation (IDOT) has adopted specific public participation strategies for transportation planning, coordination and finance. The IDOT engages in a broad range of activities to provide public outreach and involvement opportunities in conjunction with general transportation issues, the implementation of projects, and the development of long-range transportation plans and multi-year improvement programs.

Activities include responding to thousands of letters sent by citizens covering a variety of transportation topics. IDOT issues an average of 300 news releases annually to advise the public on transportation proposals, studies, safety issues and projects. Other public outreach activities by IDOT include holding focus groups sessions; conducting surveys; collecting information through questionnaires and public comment forms; and issuing newsletters and brochures on programs, initiatives or issues.

With most major projects and proposals, IDOT establishes a community-involvement process to enable interest groups and individuals to participate through

work groups, task forces and committees. In addition, the IDOT holds public hearings in conjunction with the preparation of federally required Environmental Impact Statements, Environmental Assessments and on most projects that involve significant right-of-way acquisition.

Each year, the IDOT publishes *For the Record*. This report provides a detailed, project-specific status of program accomplishments against overall objectives. It is submitted to the General Assembly and made available to the media, public officials and the citizens of Illinois in an effort to provide accountability for IDOT's actions to the public.

Recommendation #6:

The state shall adopt and fund a comprehensive transportation policy that has as its objective improved public access to people, places, jobs, goods and services and that results in greater transportation energy efficiency.

- a. Recommended actions to facilitate the adoption of this policy recommendation.
 - ✓ **Support efficient multimodal transportation systems.** Develop financial and technical assistance programs for implementing multimodal transportation systems that achieve statewide transportation goals. To support consumer choice, the state should provide adequate assistance to plan, implement and maintain energy- and resources-efficient transportation systems, especially integrated intermodal and multimodal systems, and infrastructure for pedestrians and non-motorized modes of transportation.
 - ✓ **Support transportation strategies.** Develop financial and technical-assistance programs for implementing transportation strategies in Missouri.
 - ✓ **Develop funding mechanisms to support a comprehensive transportation system.** Transportation planners and decision-makers should review, and, where appropriate, modify the allocation of transportation funds to support a renewed comprehensive state transportation system, including protection and maintenance of existing infrastructure, and development of appropriate new construction and cost-effective alternative transportation strategies. Funding policies and formulas have been developed primarily for new and renovated roadway construction and maintenance. Without sacrificing protection of existing investments, the state should develop and/or broaden funding and budgeting strategies to accommodate contemporary policies, goals and responsibilities.

b. Policy Initiatives

Missouri State Government

Governor Carnahan's Total Transportation Commission established on July 15, 1996, will study Missouri's comprehensive transportation needs and examine how the state's modes of transportation should be integrated. The commission's recommendations are being developed in parallel with the transportation-policy recommendations of the Coalition.

The Missouri Department of Transportation initiated in 1993-94 the development of its *Show-Me Transportation: Missouri's Long Range Transportation Plan* for the state of Missouri. The plan attempts to address a larger array of transportation issues, as required by the Intermodal Surface Transportation Efficiency Act. The long-range plan was adopted by the Missouri Highways and Transportation Commission in January 1995.

In the Spring of 1996, the East-West Gateway Coordinating Council and the Missouri Department of Transportation initiated a Memorandum of Understanding in an effort to create a transportation-planning partnership for the St. Louis region. Mutually adopted by the Missouri Highway and Transportation Commission and the East-West Gateway Coordinating Council's Board of Directors, this formal agreement identifies the respective responsibilities of each organization and future transportation-planning activities.

Federal/Other States

All states are examining alternative transportation modes since the implementation of the Intermodal Surface Transportation Efficiency Act. Several states have formally adopted policies that foster the establishment of a comprehensive multimodal transportation system.

c. Supporting Programs or Projects

Missouri State Government Activities

★ Since the adoption of the Missouri Department of Transportation's *Show-Me Transportation: Missouri's Long Range Transportation Plan*, MoDOT has reorganized its internal operations and established a formal Planning Division. The role of the division is to examine alternative means of transportation for Missouri.

★ The Missouri Department of Natural Resources' Division of Energy supports the policy of a comprehensive multimodal transportation system, which shifts from the traditional thinking of providing mobility to enhancing accessibility as the fundamental goal of transportation. The division offered supporting testimony during the development of the MoDOT's *Show-Me Transportation Plan*.

Missouri Private Sector Activities

- ★ Several environmental and consumer advocacy groups, including the Sierra Club, a nationally recognized advocacy group, have also been actively involved in transportation policy and planning. Through consumer education forums, the public hearing process and legislative involvement, the Sierra Club has striven to influence transportation policy in Missouri.
- ★ Citizens for Modern Transit is also active in influencing transportation policy in Missouri. This is accomplished through citizen awareness programs, participation in policy development issues including state and local legislation, and Missouri's *Show-Me Transportation* plan, as well as participation in regional transportation planning.
- ★ Private non-profit organizations such as the Metropolitan Energy Center have advocated a comprehensive transportation policy for Missouri. The MEC has been active nationally, regionally, and at the state and local level, by providing transportation-related information and a forum by which interested individuals and organizations may participate in the decision process.

Federal/Other States' Activities

- ★ The federal Intermodal Surface Transportation Efficiency Act has provided the necessary basis for states to examine and adopt multimodal transportation policies and programs.
- ★ Washington state is also offering multimodal choices to its consumers. All Washington citizens have access through federal, state, local or private programs to at least three transportation modes.

Additionally, improvements and expansion of multimodal choices, beyond roadway connections and public transportation options, in Washington state are being targeted in high-use transportation corridors and high-density areas. Linking land use to transportation services, such as concentrating employment in areas that have multimodal choices, is being encouraged.

At intermodal terminals, including airports, ferry, rail and major bus terminals, some level of transportation service brokerage, ranging from information kiosks to on-line public transportation information systems, are available. The type of transportation service brokerage is appropriately designed to the passenger travel markets and level of demand served by the intermodal terminal.

★ In a recent report to the Texas Sustainable Development Council, it was found that an energy-efficient, environmentally friendly transportation system can be achieved through a more rigorous application of transportation management, technological improvements, pricing policies and land-use changes. Rather than independent, these options are complementary and sometimes intertwined. A comprehensive transportation system may be realized if all modes of transportation are considered in the equation.

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**Policy
Recommendations
Part 3**

**Residential,
Institutional,
Commercial
and Industrial
Facilities**

Introduction

When building a home, remodeling a business, purchasing a new appliance, or replacing a heating system, decisions can be made that save energy and money and reduce environmental impact in the long-term. However, the person making the decision does not always have time to become an energy expert, nor the means to compare the environmental impacts and costs — first costs, utility costs, maintenance costs and disposal costs — of each alternative.

By making information more available, people can address energy-efficiency concerns before the building is designed or constructed, when it is most economical, and can consider energy efficiency when buildings are renovated or when new equipment and appliances are purchased.

Along with saving both energy and money, wider use of efficient building technologies will reduce environmental impacts, offset the need for additional electric generating capacity and reduce national dependence on imported oil. Currently, residential and commercial buildings account for approximately one-third of all U.S. energy production.

The second-largest user of energy in Missouri is the residential sector at 26 percent, followed by the industrial sector at 17 percent and the commercial sector at 16 percent. Much of the energy consumption in the residential and commercial sector is for space heating and cooling, water heating, lighting, and food storage. Using cost-effective energy technologies, energy consumption could be reduced significantly.

The average energy burden for low-income families is much greater than for families at the median income level. According to a 1995 National Consumer Law Center report, families receiving Aid to Families with Dependent Children (AFDC) paid an average 26 percent of their income toward energy, while median income families spent an average of less than 4 percent of their incomes on energy. The AFDC households had the lowest incomes and the highest energy burden of all segments of the low-income population studied. For single-elderly-poor and disabled people living on Social Security benefits, the average energy burden averaged more than 19 percent of their income.

Private sector and state government activities that affect the design and construction of new buildings and the operation of existing buildings range from collecting and disseminating information to financing of building energy-efficiency measures.

Residential, Institutional, Commercial and Industrial Facilities

This section presents a summary of residential, institutional, commercial and industrial facilities' policy recommendations. If adopted, these recommendations will promote diverse, competitive and affordable energy service choices that best contribute toward sustainable economic growth and environmental quality in Missouri. In addition, safe and reliable energy systems that improve human health and increase productivity will be promoted.

Goal

Provide the residential, commercial and industrial consumers of energy services for buildings in Missouri diverse, competitive and affordable choices that best contribute toward sustainable economic development and environmental quality; and maintain high standards for safety and reliability with energy systems that promote improved human health and increased productivity.

Objectives

- Encourage life-cycle costing when considering building design and operation.
- Support both educational efforts and mandates for energy efficiency in buildings.
- Support energy services for low-income households.

Policy Recommendations

Recommendation #1:

Missouri should adopt building codes based on life-cycle costing that establish cost-effective minimum energy-efficiency standards for new residential and commercial facilities.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Adopt the ASHRAE 90.1-1989 energy code and subsequent upgrades as the minimum Missouri performance standard for commercial buildings.** The benefits of minimum energy-efficiency standards are outlined in the report authorized by House Concurrent Resolution 16, *Economic Opportunities Through Energy Efficiency and the Energy Policy Act of 1992*.

✓ **Adopt the CABO Model Energy Code as the minimum Missouri performance standard for residential buildings.** The benefits of minimum energy-efficiency standards are outlined in the report authorized by House Concurrent Resolution 16, *Economic Opportunities Through Energy Efficiency and the Energy Policy Act of 1992*.

✓ **Develop and promote voluntary building standards for optimal energy performance.** Develop and inform the public of voluntary standards that promote aggressive methods for improving energy-efficiency and environmentally sound building design that exceed ASHRAE 90.1 and the CABO model energy code. Build on the work of other states and the Federal Energy Management Program. The benefits of advanced energy-efficiency standards are outlined in the report authorized by House Concurrent Resolution 16, *Economic Opportunities Through Energy Efficiency and the Energy Policy Act of 1992*.

- b. Policy Initiatives

Missouri State Government

Two bills, House Bills 795 and 879, were considered by the 88th Missouri General Assembly (1996), Second Regular Session. Neither bill was passed during the session. House Bill 795 requires every county to have enacted and to enforce a building code by August 28, 1998. However, any county may hold a public referendum on whether to exempt the county from the requirements of the bill. House Bill 879 permits counties to adopt and enforce all or part of any of the three nationally recognized model building codes upon approval of the voters.

Residential, Institutional, Commercial and Industrial Facilities

Not all of the nationally recognized codes currently require that the CABO MEC be followed for residential construction. Passage of a building code will not necessarily provide for energy-efficient construction.

Federal/Other States

The Energy Policy Act of 1992 (EPACT) requires stricter energy-efficiency standards for new commercial buildings, with a minimum standard of the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings, ASHRAE Standard 90.1. EPACT also recommends higher standards for residential buildings, with a minimum standard of the Council of American Building Officials Model Energy Code (CABO MEC) .

c. Supporting Programs and Projects

Missouri State Government Activities

★ The Department of Natural Resources' Division of Energy attends the monthly meetings of the Missouri Committee for Model Codes and offers technical assistance as appropriate to facilitate the process toward obtaining minimum energy-efficiency codes.

★ The Department of Natural Resources' Division of Energy promotes advanced energy-efficiency design in new construction by providing ongoing technical assistance to residential clients and state facilities.

Missouri Private Sector Activities

★ The Missouri Committee for Model Codes' primary focus is to align support for legislation to establish a statewide building code, to identify potential sponsors and strategies for passage of such a bill, and to educate legislators on the benefits of a statewide code.

Federal/Other States' Activities

★ Efforts are under way by the various building code administrators to combine the multiple nationally recognized codes into one code. A combined code may reference the minimum energy standards required by EPACT. This would assist builders so that they would only need to consult one energy code.

★ ASHRAE is in the process of updating the building standard to incorporate cost-effective lighting strategies, including general lighting and lighting controls.

Residential, Institutional, Commercial and Industrial Facilities

Recommendation #2:

Apply life-cycle costing methodologies in state government in the design and/or retrofit of energy systems and buildings, and share the lessons learned with other public and private organizations.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Accelerate and expand implementation of the Energy Efficiency in State Facilities (EESF) program.** This program, authorized in 1993 by Sections 8.800-8.851, RSMo, reduces state government utility expenditures by increasing cost-effective energy efficiencies and renewable-energy applications. Effective implementation incorporates life-cycle costing principles, a minimum energy-efficiency standard, energy audits and upgrades, advanced energy-efficiency and renewable design, commissioning and recommissioning, education and training, and alternative financing options. Lessons learned can be applied to other public facilities, and services may be adapted for use by the private sector. To date, budget processes have failed to support agencies that invest in developing sound energy-efficiency plans.

To facilitate funding of energy projects, the Office of Administration should provide its life-cycle costing analyses to the legislative Joint Committee on Capital Improvements for the committee's use in reviewing capital improvement energy project budget requests. Review of the life-cycle analyses would allow funding decisions to be based on the energy savings over the life of the project rather than the current budget process that limits review to the initial cost of the capital improvement.

- b. Policy Initiatives

Missouri State Government

The General Assembly established the Energy Efficiency in State Facilities Program, authorized by House Bill 195 and Senate Bill 80 in 1993 (Sections 8.800-8.851, RSMo) to reduce state government utility expenditures through encouraging or mandating cost-effective energy efficiencies and renewable-energy sources in state facilities. Life-cycle costing is required to be considered in the design of energy systems for new construction and for major renovation of existing facilities.

The Department of Natural Resources and the Office of Administration continue to work together to implement the Energy Efficiency in State Facilities Program. Three OA staff are funded for this project by the DNR.

Residential, Institutional, Commercial and Industrial Facilities

Federal/Other States

The Energy Policy Act of 1992 (EPACT) and Executive Order 12902 require that federal agencies reduce the energy consumed in federal buildings. The order increased the goal to 30 percent by 2005, when compared with 1985 energy use.

Statutes or executive orders are in place in at least 16 states establishing programs for energy efficiency in state facilities.

c. Supporting Programs and Projects

Missouri State Government Activities

★ The Department of Natural Resources and Office of Administration have been coordinating efforts since 1993 to implement the Energy Efficiency in State Facilities Program. While existing facilities are being analyzed for potential energy-efficient retrofits, a minimum energy-efficiency standard has been put into place to reduce the need for future retrofits. The Department of Natural Resources worked with the Technical Program Task Force, other state agencies and a voluntary advisory group of state and nationally recognized experts in the field of energy efficiency to develop the State Building Minimum Energy Efficiency Standard, 10 CSR 140.7.010, which became effective in February 1996.

★ The Department of Natural Resources' Division of Energy collected fiscal year 1993 utility data for almost 90 percent of state facilities with priority given to *state-owned* facilities. There are more than 4,700 state-owned facilities totaling approximately 62 million square feet, and there are more than 440 leased buildings totaling approximately 2.8 million square feet. Data analysis has been completed for nine state agencies that include 554 buildings and 16 million square feet. This data is being considered in the prioritization process to select state facilities that may benefit from an energy audit.

★ The Department of Natural Resources and Office of Administration are working with state agencies to provide technical assistance for energy projects. The phase 1 and phase 1A energy audit for the Department of Mental Health's Bellefontaine Rehabilitation Center in the St. Louis area has been completed. The facility encompasses 377,000 square feet including administration buildings, client services, group homes and a power plant.

★ The Department of Natural Resources and Office of Administration are working with the Missouri National Guard for a potential project involving Energy Savings Performance Contracting (ESPC). The National Guard received a federal mandate in 1995 to reduce energy consumption. There are 76 National Guard sites in Missouri with approximately 300 buildings and 2.5 million square feet. Additional input has been provided by the U.S. Department of Energy, Pacific Northwest Laboratories and the Oklahoma National Guard.

Residential, Institutional, Commercial and Industrial Facilities

★ An audit is under way with the University of Missouri-Rolla. The project includes six buildings encompassing 357,000 square feet including an administration building, labs and classrooms.

★ Energy audit discussions are also under way with the Department of Corrections, the Highway Patrol, the Highway Department and the University of Missouri-St. Louis.

Missouri Private Sector Activities

★ Many utility companies are promoting demand-side strategies to cost-effectively upgrade building energy systems. For example, Union Electric has a program to assist high demand users to identify cost-effective energy conservation measures through an audit program.

Federal/Other States' Activities

★ The Federal Energy Management Program (FEMP) is the lead organization implementing the federal requirement to reduce energy 30 percent from base 1985 usage. Sample contracts for Energy Service Performance Contracting and a Monitoring and Verification Protocol have been developed to assist agencies in the implementation of energy-efficiency upgrades. FEMP works in four major areas: project financing, technical guidance and assistance, coordination and reporting, and new initiatives.

★ Twenty-six states have a program for promoting energy efficiency in state facilities. These programs include one or more of the following services: utility bill analysis, utility bill reporting, energy auditing, technical assistance and financial assistance in implementing cost-effective energy measures. Two examples follow:

■ The state of Iowa has developed an energy management program to leverage energy savings to provide energy-related improvements for state agencies. The Iowa Department of Natural Resources projects total capital spending under the program in excess of \$60,000,000. Savings from improvements provide for an average payback of six years.

■ To minimize energy costs and consumption in state facilities, the Illinois Department of Energy and Natural Resources developed the State Buildings Energy Program in 1982. Nine services are offered to state agencies including: energy surveys, steam trap evaluation and maintenance, motor surveys, energy-conservation training, special projects, special studies, consulting services, cogeneration studies, publications and energy-performance contracting.

Recommendation #3:

Support the development and implementation of a Missouri Home Energy Rating System / Energy Efficiency Financing Program (HERS/EEF) as a market-based strategy to encourage energy savings and efficiency in the residential sector. Expand, if appropriate, to provide energy-efficiency financing options in the commercial and industrial sectors.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **MHDC, DNR-DE and EIERA shall promote residential energy-efficiency financing programs.** Provide information about available energy financing to economic development and community development organizations, local governments, community groups, business associations and others.

✓ **Promote a voluntary energy rating analysis for all new residential construction and major renovations.** Home buyers should have access to energy ratings that inform them of how the energy systems in homes compare to the CABO Model Energy Code. The ratings should also inform them of the benefits of exceeding minimum energy-efficiency standards.

✓ **Work with the financial community to realize the value of energy efficiency.** Financing for the construction, purchase and/or renovation of buildings traditionally has been provided by three sources: the building owner, who contributes equity to the investment; the financial markets, which offer development financing and long-term mortgages; and government, which has provided tax incentives and has invested in the development of secondary markets for mortgage financing.

These sources have historically not been included to give adequate consideration to energy efficiency and to energy costs in the financing equation. Instead, the process has been oriented only to the initial costs of construction or acquisition. This action calls for both the financing community and government to use their leverage in the financing transaction to promote greater energy efficiency. Not only is this warranted at the policy level by the economic and environmental benefits to society, but the lenders and government also stand to gain.

✓ **Support energy-efficiency training for design, building, sales and financing professionals.** Construction professionals should have access to training that provides information on the costs and benefits for compliance with minimum energy-efficiency standards, energy-efficiency construction techniques and technology, and environmentally sound construction options.

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✓ Encourage the development of a program to conduct voluntary energy rating analysis and programs that finance the incremental first costs of energy efficiency for all new commercial construction and major renovations. Commercial building tenants and investors should have access to energy ratings that inform them of how the energy systems in commercial buildings compare to the ASHRAE 90.1 standard. The ratings should also inform them of the benefits of exceeding minimum energy-efficiency standards. Energy-efficient construction will reduce long-term energy costs for the building occupants. To incorporate energy-efficiency design in new construction or major renovations, and work with financial communities to realize the value of energy efficiency.

b. Policy Initiatives

Missouri State Government

The Department of Natural Resources supports the development of a HERS/EEF. Missouri's Environmental Improvement and Energy Resources Authority held HERS workshops in 1995 for Missouri stakeholders interested in a state HERS program. Based on support shown for a market-driven, statewide initiative during these workshops, the DNR issued a request for proposals for program development and implementation in the spring of 1996. An interagency review panel recommended that the proposals not be accepted, but that the invitation for proposals be reissued in an effort to obtain additional bids.

In the 1996 legislative session, two bills related to building codes were introduced, House Bills 795 and 879. House Bill 795 would require every county to enact and enforce a building code by August 28, 1998, pending approval by a public referendum on whether to exempt the county from the requirements of the bill. House Bill 879 would permit counties to adopt and enforce all or part of any of the three nationally recognized model building codes upon approval of the voters. Neither proposal was passed by the General Assembly.

Federal/Other States

The National Energy Policy Act of 1992 (EPACT) requires DOE to promulgate, in consultation with agencies, HERS providers, builders, utilities and others, voluntary guidelines that encourage uniformity in HERS.

The Housing and Community Development Act of 1992 requires that the Federal Housing Administration (FHA) conduct energy-efficiency mortgage pilot programs in five states.

The Veterans Home Loan Program Amendments of 1992 require that the Department of Veterans' Affairs (DVA) conduct a demonstration energy-efficiency mortgage program for veterans in 50 states.

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Farmers' Home Administration (FmHA) and the Department of Housing and Urban Development (HUD) must use the Council of American Building Officials' Model Energy Code (CABO-MEC) 1992 standards for loans covering new construction.

The U.S. Department of Energy established a HERS Council to develop guidelines for a national energy-efficient rating and financing system. The U.S. Environmental Protection Agency's Energy Star Homes Program works to obtain commitments from home builders to build energy-efficient homes. Many states with established home energy rating programs or states interested in developing such programs are members of RESNET, a residential network to coordinate HERS/EEF issues.

All but 10 states have mandated statewide building codes to cover all or some buildings and occupancies. Missouri is one of these 10; however, local jurisdictions have adopted codes in many cases.

c. Supporting Programs or Projects

Missouri State Government Activities

★ The Department of Natural Resources Low-Income Weatherization Assistance Program plan allows funding for HERS rater-certification training for subgrantee staff, provided the training is related to the LIWAP work.

Missouri Private Sector Activities

★ Several communities have expressed interest in a home energy rating system. Kansas City Power and Light is in the process of implementing a pilot program that incorporates certified raters, a construction standards document and energy-efficiency financing.

★ Associated Electric Cooperative and the Department of Natural Resources cosponsored a conference on energy efficiency in home construction in October 1995.

★ Springfield City Utilities revised a handbook for residential energy conservation and distributes it to its residential customers.

Federal/Other States' Activities

★ Fannie Mae and Freddie Mac, along with the national leadership of the mortgage industry, created the initial energy mortgage guidelines. Buyers can become eligible for expanded "debt-to-income" qualifying ratio allowing a potential increase in purchasing power.

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★ The U.S. Department of Energy contracted with the national Home Energy Rating System Council to develop voluntary uniform guidelines for rating systems. The guidelines include a list of minimum-rated features, on-site inspection procedures, standard default values, assumptions for operating conditions, requirements for using climate data, and quality assurance prescriptions. DOE proposed rules in July 1995 and reopened the comment period in April 1996.

★ Five HUD/FmHA pilot programs are under way in Alaska, Arkansas, California, Vermont and Virginia. The five pilot programs are specifically designed to offer mortgages that include the cost of energy-efficiency improvements based on home energy ratings.

■ The Alaska program was developed around a public-private partnership among HUD, Energy Rated Homes of Alaska, and the Alaska Housing Finance Corporation. Its mission is to promote residential energy efficiency overall through voluntary, market-based incentives in the housing market.

■ The Arkansas program goals are to increase energy efficiency, reduce energy costs of existing residential structures and increase the number of Arkansans who can qualify for residential home loans by encouraging the installation of cost-effective improvements in existing houses.

■ The California pilot program focuses on the development and implementation of a program to determine how best to inform homeowners and potential homeowners of the availability, methods and benefits of obtaining energy-efficiency mortgages. The program requires an energy-efficiency rating as a precondition to obtaining an energy-efficiency mortgage.

■ The FmHA program in Vermont joins an existing initiative spearheaded by the Vermont Housing Finance Agency and Energy Rated Homes of Vermont. The goals of the program are to establish market penetration, generate data on the default rates and market valuation of energy-efficiency mortgages, and increase the energy efficiency of Vermont homes.

■ The HUD energy-efficiency mortgage program in Virginia has the goals of moving more low- and moderate-income Virginians into first-time home ownership and encouraging the affordable renovation of a significant portion of housing stock to make it more livable and less expensive to operate.

★ Colorado is serving as a national pilot state where workable energy-efficiency mortgage guidelines will be developed that make it easier for lenders to sell energy-efficiency mortgages in the conventional secondary market.

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★ Fifteen HERS systems are currently operating and approximately 20 other states are developing or considering new HERS systems.

Recommendation # 4:

Build on the labeling provisions of the Energy Policy Act to support a voluntary national effort for improved energy-efficiency labeling of appliances.

- a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Promote voluntary high-efficiency technologies.** Missouri should promote the use of proven high-efficiency, cost-effective equipment technologies and applications. Expand energy usage information provided to consumers. Build on the efforts of federal programs such as the U.S. DOE Energy Savers program and the Energy Star Computers program to create innovative approaches for introducing new technologies, aggregating buyers and stimulating sales of high-efficiency products.

- b. Policy Initiatives

Missouri State Government

No known policy initiatives address this policy recommendation.

Federal/Other States

The National Appliance Energy Conservation ACT (NAECA) was signed into law in 1987. The standards establish minimum energy-efficiency requirements for 12 types of residential appliances. The law includes deadlines for updating appliance standards through rulemakings conducted by DOE. In 1988, NAECA was amended to include minimum efficiency standards for fluorescent lamp ballasts.

The Energy Policy Act of 1992 (EPACT) requires stricter energy-efficiency standards for new commercial buildings and recommends higher standards for residential buildings. EPACT also requires stricter energy-efficiency standards for lighting, appliances, motors, heating and cooling systems, and other products.

- c. Supporting Programs and Projects

Missouri State Government Activities

★ No known government program or project activities.

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Missouri Private Sector Activities

- ★ No known private sector program or project activities.

Federal/Other States' Activities

★ Revised standards on refrigerators and freezers were finalized by DOE in 1989, affecting units manufactured beginning in 1993. New standards on clothes washers, clothes dryers and dishwashers were issued in 1991, affecting units manufactured starting in 1994. The national ballast standards took effect in 1990.

★ DOE has been conducting analyses and rulemakings that could lead to new efficiency standards on many of the products covered by NAECA, EPCACT and the 1988 ballast law. The proposed rule-making for energy-efficiency standards for refrigerators, refrigerator-freezers and freezers was published in the July 20, 1995; Federal Register (vol. 60, n. 139, pp. 37388-37416).

★ The Federal Trade Commission's Appliance Labeling Rule requires that packaging for three types of lamps include specific information to help consumers buy the most energy-efficient lamps that meet their needs. The rule became effective May 15, 1995. However, the FTC delayed enforcement for incandescent lamps until December 1, 1995.

★ The U.S. DOE Energy Savers program was established to create innovative approaches for introducing new technologies, aggregating buyers and stimulating sales of high-efficiency products. DOE works with many interested groups including retailers, manufacturers, utilities, energy service companies and other federal agencies. The Energy Savers retailer pilot program just completed Phase I of a major public outreach and laboratory testing effort designed to shift the market to high-efficiency home appliances and building products.

★ Federal programs such as the U.S. Environmental Protection Agency's Golden Carrot and Greenlights programs, as well as the Energy Star Computers Program, have advanced the efficiency of appliances and equipment through cooperative efforts with retailers and manufacturers.

Recommendation #5:

Support the development and coordination of state resources to assist low-income families in making their homes more energy-efficient and in the purchase of energy for their homes.

- a. Recommended actions to facilitate the adoption of this policy recommendation.
 - ✓ **Require state agencies to coordinate activities to assist low-income households with energy affordability.** This should include weatherization, energy payments assistance, and assessment of alternatives for more affordable residential rehabilitation and other housing programs for low-income families.
 - ✓ **Require cost-effective, energy-efficient design and construction for housing projects developed with federal or state funds.** Missouri should incorporate advanced energy-efficiency and environmental standards for maintenance and new construction of low-income housing. These standards should address the residents' needs for energy-efficient appliances and lighting.
 - ✓ **Support funding.** The State of Missouri should support funding of low-income energy assistance and weatherization programs from federal and state sources. For many years, federal funding has not only been the foundation, but the primary source of funding for these programs. Federal funding is declining; therefore, state funding will be required to maintain these important services. The efforts of groups to obtain state and federal funding for energy assistance and weatherization, such as the Committee to Keep Missourians Warm, should be encouraged, staffed and supported.
 - ✓ **Support energy-efficiency education for low-income families.** There should be a coordinated program to provide energy-efficiency education to low-income families. These programs should include simple-to-use weatherization techniques as well as helpful suggestions for energy-saving lifestyle changes.

- b. Policy Initiatives

Missouri State Government

The Committee to Keep Missourians Warm, with members from state and local agencies and utility providers, continues to meet monthly as it has for over 10 years, with the mission of coordinating energy assistance to low-income citizens of the state.

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The Department of Natural Resources operates the Low-Income Weatherization Assistance Program through 19 subgrantee agencies throughout the state. The DNR has redirected the program's Policy Advisory Council to guide these local agencies in responding to the challenges of program funding reductions for state and low-income constituents.

To address the reductions in federal funding for the Low-Income Heating Energy Assistance and Low-Income Weatherization Assistance Programs, two bills, Senate Bill 531 and House Bill 1372, were considered by the 88th Missouri General Assembly, Second Regular Session. These proposals were developed by the Committee to Keep Missourians Warm, of which the DNR, Division of Energy is a member. Neither bill passed. Senate Bill 531 proposed to allow up to \$20 million annually to be appropriated to the Utilicare Stabilization Fund to be used for providing financial assistance, including elderly households, for the payment of charges for the primary and secondary heating and cooling sources of the household. Ten to 20 percent of this appropriation was to go to the low-income weatherization assistance program. House Bill 1372 proposed to allow for a maximum annual appropriation of \$30 million to the Utilicare Fund with an annual transfer of 50 percent of the account balance in the Abandoned Fund Account. From 10 to 20 percent of the annual appropriation would have been designated for the low-income weatherization program.

Efforts to coordinate energy-assistance programs have begun at both the national and state levels to improve service delivery as funding is reduced for federal energy programs.

Federal/Other States

Missouri's longstanding, highly successful Low-Income Weatherization Assistance Program (LIWAP) has suffered a 50 percent reduction in federal funding, effective in fiscal year 1997. The federal program is noteworthy for returning up to 19 percent in reductions in energy consumption per dwelling unit, improving human comfort and safety, providing local employment for skilled workers, and, in states where the programs are coordinated, increasing the effectiveness of the Low-Income Heating Energy Assistance Program (LIHEAP). The LIWAP is a cost-effective program designed to give states the technical and financial assistance they need to weatherize homes of low- and fixed- income households that struggle to pay fuel bills. Federal investments in this program leverage state and local funding. Energy efficiency remains the most effective strategy to reduce dependence and keep family utility bills low — and, consequently, to develop family self-sufficiency. This program is important not only because it reduces low-income reliance on public federal fuel assistance or the Low-Income Home Energy Assistance Program (LIHEAP), but it often allows elderly clients to stay in their own homes.

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Since the program began in 1978, federal funds have helped to weatherize more than 128,000 Missouri homes. The average cost to weatherize a Missouri home in state fiscal year 1996 was \$1,831.

The National Governors' Association supports continued funding of the federal Low-Income Home Energy Assistance Program, to meet home heating and cooling needs. LIHEAP is administered by the Missouri Department of Social Services and provides funds to eligible low-income households to help pay for utility bills.

c. Supporting Programs or Projects

Missouri State Government Activities

★ The Department of Natural Resources' 19 Low-Income Weatherization Assistance Program subgrantees administer services to deliver residential energy-conservation measures to qualified clients.

★ In consultation with local agencies, other states and U.S. DOE, the Department of Natural Resources is taking several steps to provide coordination for the Low Income Weatherization Assistance Program including: providing timely situational information, finding ways to maintain quality standards while reducing administrative burdens wherever possible, increasing for one year the amount of allowable carryover funds to provide a less precipitous drop in service and employment, and revitalizing the program's Policy Advisory Committee to guide the agencies in responding long-term to the challenge for the state and low-income constituents.

Missouri Private Sector Activities

★ The Department of Natural Resources' Division of Energy's 19 Low-Income Weatherization Assistance Program subgrantees have leveraged \$1,213,588 from federal programs, corporate contributions, for-profit operations, utility companies, the Farmers' Home Administration, and landlord contributions to assist in weatherization of Missouri homes in program year 1995.

★ Private non-profit organizations such as Energycare in St. Louis and the Metropolitan Energy Center in Kansas City, Missouri, continue to actively pursue other financial resources for weatherization activities in the state.

★ The Missouri Public Service division of UtiliCorp United sponsors the Energy Aid program where customers can make contributions along with their monthly gas or electric bill payment. These contributions are matched by up to \$25,000 per year from UtiliCorp.

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The total contribution is administered by the Mid American Assistance Coalition Energy Aid to help elderly, disabled and low-income families pay their energy bills.

Federal/Other States' Activities

★ The New York Power Authority and the New York City Housing Authority are installing 14.4 cubic-foot refrigerators in apartments this year. These refrigerators are CFC-free and save each household about \$50 per year. The refrigerator energy cost savings are expected to finance their purchase. This was part of a DOE mass-purchasing initiative that reduces the costs of energy-saving products.

★ The Atlanta Housing Authority, the U.S. Department of Energy and the U.S. Department of Housing and Urban Development have joined forces to increase the energy efficiency of at least half of the Atlanta Housing Authority's 2 million Housing and Urban Development assisted homes by 30 percent by the year 2000.

Recommendation #6:

Throughout the transition to a deregulated or less-regulated power industry in Missouri and regionally, the state should act to protect the public interest.

- a. Recommended actions to facilitate the adoption of this policy recommendation.
 - ✓ **Minimize degradation of Missouri's environment attributable to energy production, distribution and use.** Energy production, distribution and use impacts Missouri's environment. Environmental quality and stewardship of resources should be maintained in a manner that assures consideration of energy efficiency and renewable resources. The Department of Natural Resources and the Public Service Commission shall work together to minimize environmental degradation.
 - ✓ **Support informed consumer choice.** The key to direct access is that all customers are given a choice, based on meaningful information, to purchase energy from alternative suppliers. The state of Missouri should assure that accurate information is provided to all customers. Information on meaningful and equivalent choices for the provision of energy, particularly from energy supplies derived from Missouri renewable resources, should be made available to all customers.
 - ✓ **Develop strategies that protect the interests of small consumers.** The Missouri Public Service Commission, in consultation with other agencies including the Department of Natural Resources, the Office of Public Counsel and others, should protect the interests of low-income and low-demand energy consumers when negotiating the terms of retail

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deregulation. Affordable access and equity among all customer classes, especially small business, residential and low-income consumers, should be assured. Policy makers should monitor other states' experiences and thoroughly evaluate Missouri's options.

b. Policy Initiatives

Missouri State Government

The Missouri Public Service Commission is convening roundtable discussions to bring together stakeholders to address deregulation of the electric and natural gas utility industries. At this time, no policy options have been recommended by the Public Service Commission.

Federal/Other States

The Federal Energy Regulatory Commission (FERC) issued a rule that gives the responsibility of the choice of retail competition to the individual states. The FERC possesses jurisdictional power over the wholesale rates of energy sold in interstate commerce while states possess authority in regulating local distribution and retail rates. Congress is considering a federal legislative proposal that would set federal guidelines for states as they address restructuring issues. Although they did not pass in 1996, supporters plan to reintroduce the proposals in 1997.

The U.S. Department of Energy is serving as an information resource for states as they address restructuring in their individual states. Other states are addressing utility restructuring at different paces and in different ways — some through regulatory proceedings and some through legislative measures. California, Massachusetts, New York and Wisconsin opened investigations into restructuring and have issued decisions on how it should proceed in their states. New Hampshire passed a law that authorizes its public utility commission to require utilities to implement retail wheeling for all customer classes between July 1997 and July 1998; however, the state's supreme court has accepted an appeal from a utility company challenging the actions of the commission under the law. Others are investigating, formally and informally, the impact deregulation would have on their states. Other states have taken no action — Arkansas and Nebraska have concluded that restructuring would not be in the best interest of the citizens of their states.

In several states and at the national level, coalitions of stakeholders are forming to take positions to protect the public interest. The National Association of Utility Regulatory Commissioners (NARUC) and the National Consumer Law Center (NCLC) were among the first to issue principles that represent all consumers' interests in the process. Ohio, Minnesota and New York have formed such coalitions. These guiding principles advocate protection of vulnerable customers through universal service within assigned service areas at reasonable cost and equity between customer classes.

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c. Supporting Programs and Projects

Missouri State Government Activities

★(See b. Policy Initiatives, Missouri State Government, above.)

Missouri Private Sector Activities

★ There is much activity in the utility industry to adjust to the shift from a regulated environment that provides for cost recovery of investments to a competitive market with no service areas. Many utilities are considering mergers and streamlining to provide value-added services to consumers.

Federal/Other States' Activities

(See b. Policy Initiatives, Federal/Other States, above.)

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**Policy
Recommendations
Part 4**

**Alternative-
and
Renewable-
Energy
Supplies**

Introduction

The most significantly consumed forms of energy in Missouri are petroleum and petroleum-based products. As reported by the 1992 *Missouri Statewide Energy Study*, petroleum expenditures accounted for nearly 52 percent of 1990 Missouri energy expenditures. Although in the future fossil fuels will continue to play an important role in supplying Missouri's energy needs, any strategy to reduce dependence on fossil fuels must begin by improving energy efficiency. But energy efficiency alone will not be enough. New energy sources will be needed to replace at least a portion of the fossil fuels we use.

Alternative and renewable fuels must play an increasing role in providing energy for Missouri's future and for the state's energy security. Approximately 8 percent of the national energy supply is provided by renewables, 46 percent of which is from hydropower. Besides hydropower, renewable-energy resources include solar; wind and geothermal energy; biomass resources such as forestry and crop waste; municipal solid waste; fuel ethanol; biodiesel; and methane gas from landfills and from animal and municipal waste water treatment systems.

In addition to renewable fuels, Missouri must use other "alternative" transportation fuels, which burn cleaner and are more "secure" than traditional gasoline and diesel fuels. These fuels include natural gas, ethanol, biodiesel, methanol, propane and electricity.

Many Missourians are involved in activities that affect the current and future availability and affordability of alternative and renewable solid, liquid and gaseous fuel supplies. Private sector activities and those of other state governments include information collection and dissemination, building of infrastructure, and construction of facilities that will use these alternative and renewable fuels.

This section presents a summary of renewable- and alternative-energy supply policy recommendations. If adopted, these recommendations will nurture the development of sustainable alternative- and renewable- energy supplies and promote energy efficiency, energy security, economic development and environmental enhancement.

Goal

Develop alternative- and renewable-energy sources that improve Missouri's economic productivity and environment. The priority should focus on energy sources that originate in Missouri.

Objectives

- Create an environment in Missouri that nurtures the development of those alternative- and renewable- energy supplies that provide our state the greatest long-term competitive advantage, economically and environmentally.
- Improve the efficiency of fossil fuel use.
- Assess the relative practicality of alternative- and renewable-energy sources in our region, including consideration of life-cycle costs, macro-economic impacts and environmental concerns.
- Focus priority on energy sources that are indigenous to Missouri.

Policy Recommendations

Recommendation #1:

Purchase and use alternative and renewable motor-vehicle fuels in state government and share lessons learned with other public and private fleet managers.

- a. Recommended actions to facilitate the adoption of this policy recommendation.
 - ✓ **Raise the incremental cost allowance for alternative-fuel vehicles currently in state law (5 percent) to 12 percent in order to meet federally mandated alternative-fuel vehicle purchase requirements in state fleets.** The Energy Policy Act of 1992 requires states to purchase and use alternative-fuel vehicles in their public fleets. The provisions of sections 414.400-.417, RSMo, that require state fleets to use alternative and renewable fuels will need to be amended to allow compliance with its goals. Current cost analyses range from 4 to 17 percent for alternative-fuel vehicles over the cost of gasoline vehicles.
 - ✓ **Support federal funding for alternative-fuel use.** Encourage the federal government to implement and support the alternative-fuel use requirements of the Energy Policy Act of 1992 (EPACT). Without federal and state fleet commitment, industry is unlikely to develop the necessary technology. Federal funding incentives authorized by EPACT for state governments to accelerate the use of alternative-fuel vehicles have not been provided to the states. Currently federal agencies are not in compliance with the vehicle purchase provisions of EPACT because of administrative and budget barriers to the purchase of alternative-fuel vehicles.

Alternative- and Renewable-Energy Supplies

✓ **Create markets and infrastructure for alternative fuels.** Industry and government must share responsibility for creating and meeting demand for alternative fuels and vehicles. Fuel producers and suppliers, fleet managers and vehicle manufacturers must work together to increase the use of alternative fuels. State, federal, local government and private fleet managers should work together to create demand for alternative fuels that is sufficient to support installation of alternative-fuel refueling facilities. Implementation of fuel infrastructure occurs at the local level, so local government can play a pivotal role in working with suppliers and users to assure mutually beneficial matches of fuel and vehicle availability. Unless fleet managers and individual vehicle operators are assured of availability of fuel, they cannot be expected to purchase alternative-fuel vehicles. A concerted commitment toward infrastructure and market development on the part of one or more fuel supplier groups is required to support widespread adoption. Manufacturers must provide alternative-fuel vehicles in sufficient quantities to meet fleet managers' needs. The state of Missouri should support the Clean Cities initiative.

The DOE's Clean Cities program is a voluntary federal program designed to accelerate and expand the use of alternative-fuel vehicles in communities throughout the country and to provide refueling and maintenance facilities for their operations. The Clean Cities program should serve as a source of coordination in areas where it is currently established or is being developed, but funding is still needed to allow successful implementation.

b. Policy Initiatives

Missouri State Government

In 1991, the Missouri General Assembly passed legislation to reduce fuel consumption and increase use of alternative and renewable fuels by state fleets (Sections 414.400-414.417, RSMo).

The 88th General Assembly, Second Regular Session (1996), considered House Bill 995 and Senate Bill 893, which would have amended the current state fleet program (Sections 414.400-414.417, RSMo). Major provisions included consistency with the federal Energy Policy Act and life-cycle costing analysis. Current law does not allow the purchase of alternative-fuel vehicles if their life-cycle cost exceeds the cost of other vehicles by more than 5 percent. Without statutory changes or lower-cost, alternative-fuel vehicles, state fleets will not be able to comply with the requirements of the law. Neither proposal was passed by the General Assembly. Plans for future consideration of amended policy proposals are indefinite.

The Department of Natural Resources (DNR) is exempt from the statutory cost restrictions for the purchase of alternative-fuel vehicles for the purpose of demonstrating their use and performance in the state fleet. As a result, DNR is the only state agency in compliance with

Alternative- and Renewable-Energy Supplies

the schedule of required purchases. The Missouri Department of Transportation has made some purchases, and the DNR purchased and transferred 10 alternative-fuel vehicles to the Department of Agriculture in 1994.

Federal/Other States

The federal Clean Air Act Amendments of 1990 (CAA) and the Energy Policy Act of 1992 (EPACT) laid out the principal elements of the federal framework for promoting the use of alternative fuel. The Acts' requirements were designed (1) to stimulate research and development and accelerated introduction of cleaner fuels and (2) to build on earlier policies for improving fuel economy and promoting alternative fuels. In regions with serious ozone problems, the CAA requires fleets of 10 or more vehicles that can be centrally fueled to begin phasing in alternatively fueled vehicles by 1998. Under EPACT, private fleets, the federal government and state governments are required to increase the percentage of vehicles that are powered by alternative fuels.

c. Supporting Programs or Projects

Missouri State Government Activities

★ In 1991, the Missouri Legislature passed legislation with goals of reducing fuel consumption and encouraging the use of alternative and renewable fuels by state fleets (Sections 414.400-414.417, RSMo). DNR's Division of Energy provides technical assistance to state agencies in the development of their fleet plans through training sessions, development of a model plan and ongoing technical assistance. The Division of Energy convened a Fuel Conservation for State Vehicles Program Stakeholders Group, consisting of representatives from some state agencies, fuel providers and legislative staff to address issues of implementation that were filed in the 1996 General Assembly.

Missouri Private Sector Activities

★ Public and private partnerships to place alternative transportation fuels throughout Missouri and the Midwest are currently under way. Several alternative-fueling facilities have already been established; plans are currently under way to establish additional facilities through the end of the decade. Ethanol, natural gas and propane are being made available to both private and public fleets throughout Missouri.

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★ The National Ethanol Vehicle Coalition is developing a Midwest E-85 refueling infrastructure in conjunction with federal and state agencies and corn growers associations. A network of E-85 stations throughout the Midwest is the intended result, and the Missouri Corn Growers Association and the Department of Natural Resources have contributed to the project.

Federal/Other States' Activities

★ The federal Clean Air Act Amendments of 1990 and the 1992 federal Energy Policy Act lay out the principal elements of the federal framework for promoting the use of alternative fuel. The Acts' requirements were designed to stimulate research and development, to accelerate introduction of cleaner fuels and to build on earlier policies for improving fuel economy and promoting alternative fuels.

Recommendation #2:

Increase domestic state energy production by increasing and/or optimizing the use of solar, wind, biomass, and alternative sources of power, and their supporting technologies, with first priority on Missouri resources when they provide the same- or lower-cost power.

a. Recommended actions to facilitate the adoption of this policy recommendation.

✓ **Support continued federal investment in renewable-energy research and development.** The state of Missouri should encourage the federal government to increase funding of federal activities in renewable-energy research and technology development as well as incentive programs to allow these new technologies to overcome cost-of-entry barriers to energy markets. Renewable-energy technologies and processes have demonstrated a consistent high payback to the nation, both economically and environmentally.

✓ **Support federal grants to states for technology transfer and commercialization.** The transfer and commercialization of new technologies in this area is extremely site-specific. As part of this federal investment, state energy offices must be provided sufficient resources to inform and coordinate local and regional activities.

✓ **Adopt a state renewable-energy strategy.** State government, in cooperation with local governments and the private sector, should develop a state renewable-energy strategy to take advantage of opportunities to increase the amount of renewable energy produced in the state. Economic development programs should work to attract producers and suppliers of renewable-energy resources and technologies to the state. The state should develop protocols

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that facilitate appropriate technical and financial assistance to this new industry. In order to protect the environment, improve public health, provide economic opportunities, and prepare for the diminishing supply of fossil fuels, a renewable-energy strategy should be put into place.

In addition, Missouri should encourage the U.S. Army Corps of Engineers to maintain all federal hydro-electric generating capacity in ready-to-use condition to avoid loss of power generation.

✓ **Adopt a state alternative-energy strategy.** State government, in cooperation with local governments and the private sector, should develop a state alternative-energy strategy to take advantage of opportunities to increase the amount of alternative energy used in the state.

b. Policy Initiatives

Missouri State Government

The State of Missouri has adopted special tax provisions to promote the development of renewable fuels. These include:

■ Chapter 142.028, RSMo, which allows fuel-ethanol producers located in Missouri to receive production incentive payments of \$0.20 per gallon for the first 12.5 million gallons of qualified fuel ethanol produced from Missouri agricultural products per year, and \$0.05 per gallon for the next 12.5 million gallons per year. This incentive may be collected for up to 60 months and improves the economic viability of new ethanol-production facilities.

The 88th General Assembly, Second Regular Session (1996) considered modifications to the Ethanol Producers' Incentive Program that would limit incentive payments only to qualifying plants that are 85 percent owned by producers of agricultural products. The proposal would have expanded the incentive payment to other forms of alcohol and provided incentives for the use of closed-loop biomass in a cogeneration production plant. This proposal was not passed.

■ A \$5 per ton income tax credit for the conversion of wood waste to a fuel such as wood flour or wood pellets, Section 135.31, RSMo, ended June 30, 1995. The 88th General Assembly, Second Regular Session (1996) reauthorized this tax credit without a termination date, but added the stipulation that a company could receive the credit for only five years.

Alternative- and Renewable-Energy Supplies

The state also is working toward establishing an alternative-fuel industry in Missouri by the adoption of legislation and programs such as the following:

- Chapter 8.810, RSMo, requires the director of the Division of Design and Construction to require an analysis of renewable-energy sources and their possible use whenever construction or substantial renovation of a state building is being planned. Life-cycle cost analysis is to be applied. This can create markets for renewable-energy technologies.
- The Missouri Ethanol and Other Renewable Fuels Commission was established by the legislature in 1995 to promote the continued production and use of ethanol blends and other renewable fuels in the state.
- An amendment to Section 274, RSMo, passed by the legislature in 1996, clarifies the degree to which cooperative marketing associations may use non-member equity funding. This has a potential impact on the ability of farmer cooperatives to finance ethanol-production facilities or other producer-owned, value-added energy operations.
- Additional authority was given to the Department of Economic Development to offer financial assistance to attract eligible industries to Missouri. Included in the definition of “large-scale economic development projects” are businesses located in Missouri and engaged in agricultural processing, which includes ethanol production. This proposal was passed by the General Assembly.
- Chapter 178.891, RSMo, allows the general assembly to “make appropriations to the commissioner of administration for grants to Crowder College in the planning and administration of the Missouri alternative- and renewable-energy center” once Crowder College establishes an endowment fund for partial funding of the center. Crowder College may accept funds from other sources as well. Funds are to be spent for “a program of instruction in alternative energy, public educational services including instruction in Missouri elementary and secondary schools, service to Missouri industries through cooperative project and in-service training, and applied research in alternative-energy applications.”
- Chapter 252.300, RSMo, calls for the development of an agroforestry program to provide incentives for and encourage the planting of trees in conjunction with grass or row crops. This was initially developed to complement the federal Conservation Reserve Program and to help create new economic opportunities for Missourians. This planting method can be used to produce woody and/or grassy energy crops.

Alternative- and Renewable-Energy Supplies

■ The Missouri Commission on Global Climate Change and Ozone Depletion was established by the legislature in 1989. In 1991, the Commission made recommendations favoring the use of biomass, solar and wind as energy sources.

■ The Missouri Propane Education and Research Council (PERC) was established in 1993 by state law to promote the use of propane. The Council began operations in 1994.

Federal/Other States

Section 29 of the U.S. Internal Revenue Code allows a tax credit of 99.3 cents per million Btu for biogas sold to an unrelated user, who then generates electricity or uses the gas in some other way. Facilities must be under contract and operating by the end of 1996 unless the provision is extended by the current congress. Given the price of delivered natural gas moving about in the \$1.60 to \$2.14 per million Btu range, this 99.3 cent per million Btu credit is very powerful.

Section 45 of the Internal Revenue Code allows a 1.5 cent-per-kWh tax credit for electricity generated from "closed-loop biomass" and sold to another entity. Closed-loop biomass is biomass that is planted specifically for use as a fuel. Projects must be in service by June 1999.

The alcohol-fuels tax credit varies from 54 to 60 cents per gallon for ethanol and methanol respectively. Small ethanol producers, those whose production capacity is less than 30 million gallons per year, get an additional 10 cents per gallon credit. But, due to the details of the legislative language, only 65 percent of the credit amount is actually realized by a regular corporation.

The U.S. Department of Energy has ongoing programs supporting all areas of basic and applied research and development in renewable energy. Funding in these programs has suffered under federal budget reduction efforts. The U.S. Department of Agriculture also has an energy program studying the potential effects of biomass and other renewable-energy technologies on farming and rural quality of life.

The U.S. Department of Energy encourages the development and use of new sources of clean energy, including energy-efficiency and renewable-energy technologies, through its industrial-energy programs, research and development at the DOE laboratories, and transportation-energy programs.

Numerous other states encourage the production and use of alternative fuels through tax, and other financial, assistance and demand-side management incentives.

Alternative- and Renewable-Energy Supplies

c. Supporting Programs and Projects

Missouri State Government Activities

★ The Division of Energy is engaged in an agreement with the Mark Twain Solid Waste District to study the feasibility of converting a coal-fired industrial boiler in that district to one that would burn a mix of wood wastes, waste tires, municipal solid waste, selected non-hazardous industrial wastes and energy crops (perennial grasses or woody plants grown specifically to produce energy). This project will supply information on the technologic, economic, ecologic and community-development issues that such a system may impact positively or negatively.

★ Various agencies within state government contain information that will be useful in developing alternative- and renewable-energy sources in Missouri. The Public Service Commission maintains maps of fuel-pipeline and electric-transmission-line locations. The Division of Environmental Quality has information on location and size of operating and closed solid-waste landfills; of all large, confined, animal-feeding operations; of municipal wastewater-treatment facilities and of all sizable power-producing facilities. The Department of Conservation has inventory information on standing-timber resources and wood residues from primary-wood producers, and it is collecting, in conjunction with the Division of Energy, information on wood residues from secondary-wood processors. The Missouri Department of Agriculture maintains statistics on production of all major crops and livestock by county. Other agencies such as DE, the Environmental Improvement and Energy Resources Authority, and the Department of Economic Development provide technical and financial assistance within statutory limitations to those who would develop new businesses or expand or retrofit existing enterprises to utilize alternative or renewable fuels.

Missouri Private Sector Activities

★ The Fred Weber Landfill in St. Louis County has for years captured methane generated in closed portions of that facility and used this fuel to heat greenhouses and provide energy for an asphalt plant. Pattonville High School is converting its heating system to use landfill gas from this same landfill. Illinois Coal Gas is negotiating the development of a system to deliver landfill gas to the Neosho industrial park for use by one of the local industries, a move that will reduce danger of shortfalls in natural gas at that location. Another landfill in the St. Louis area is considering capturing its landfill gas and compressing it for use in compressed natural gas engines to be installed in its refuse trucks.

★ Several Missouri wood product manufacturers use their wood waste as a fuel source for kiln drying and other process heat needs.

★ A significant amount of research in wind, solar and biomass energy is being conducted at the National Renewable Energy Laboratory, which is operated under contract by the Midwest Research Institute, a Missouri business.

Alternative- and Renewable-Energy Supplies

★ The Missouri Public Service division of UtiliCorp United has furthered the acceptance of solar energy and supported solar-energy technology in Missouri by cosponsoring the display of an electric car at the 1996 Missouri State Fair and by separately funding the University of Missouri-Columbia and the University of Missouri-Rolla solar car teams in 1993 and 1995, respectively. The solar car race is a biennial, multistate solar car race in which college teams compete. Both races traveled through Missouri with various stops to educate the public about solar technology.

★ The Union Electric Company is conducting base-line studies in wind energy and biomass electric generation potential in Missouri and has initiated studies on how to develop a "Green Pricing" mechanism for renewable energy produced by the company.

Federal/Other States' Activities

★ The Southeast Regional Biomass Energy Program is currently funding one Missouri study of methane generation from swine lagoons and another studying the feasibility of using switchgrass as a pelletized boiler fuel.

★ New York State has identified as one of its energy goals: "Maximize the use of renewable- and indigenous-energy resources in applications where the value to the end-user exceeds the cost of alternative solutions." Efforts are being made to increase the state's production and use of wind, solar and biomass energy.

★ Nebraska's legislative Natural Resources Committee is, in 1996, considering an interim study resolution to look at using non-grain feedstocks such as grasses and corn stover in their production of fuel ethanol. Nebraska has four fuel-ethanol facilities with a combined capacity of 175 million gallons per year. A \$330,000 project to better characterize the state's wind resource potential is under development.

Conclusion

If the state's economy, environment and population are to remain healthy, Missouri needs to look beyond today and plan ahead to meet the issues of tomorrow. The state should begin to invest in cost-effective energy-efficiency measures in all modes of transport and in residential and commercial construction. We also must enhance the use of alternative and renewable forms of energy, and we must continue to educate the public about the benefits of such investments.

The issues addressed in this report clearly demonstrate that Missouri must focus on meeting the energy needs of the coming century. As with any journey, the process requires a map. By bringing together many people with sometimes differing interests, the Energy Futures Coalition developed such a map in this report.

On behalf of all Missourians, the Energy Futures Coalition encourages you to explore the possibilities with this report as a guide. It is up to all of us to continue the journey.

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Appendix A:

Relationship of the Coalition's policy recommendations to the EFC objectives, to EFC interim recommendations and to corresponding recommendations in the *1992 Statewide Energy Study* and *HCR 16* report.

Part I. Education, Information, Marketing and Incentives

Recommendation #1:

Develop a coordinated, accessible public and private information network, linking data from diverse, reliable information resources. Include public access to information on current energy policy, economic, technical and consumer issues that originate from federal, state and public agencies, and the private sector.

— Corresponds to the EFC Objectives:

- Raise public awareness, and assure Missouri citizens have timely access to reliable information about how energy choices are related to environmental and economic quality of life.
- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.

— Corresponds to the EFC Interim Recommendations:

- Support development of a coordinated, accessible public energy-information network, linking data from diverse, reliable information resources.
- Develop an effective public information dissemination program about energy policy, economic, technical and consumer issues from state agencies.

— Corresponds to the 1992 Study Recommendations:

- Organize activities to promote an increase in the general awareness and appreciation of energy resource issues.
- Develop programs within individual communities to promote energy efficiency.
- Focus the expertise of the state's energy-related organizations to communicate technical energy information to consumers.

— Corresponds to the HCR 16 Recommendations:

- Develop effective strategies to give Missourians from all sectors access to reliable and usable energy information, including a method to assure access to reliable building energy audits and analysis for all building owners or tenants.

- Support and encourage programs that promote energy efficiency such as the Home Energy Rating Systems, Green Builder Councils, and training and certification programs. Encourage the transfer of successful experiences by recognizing and promoting effective local and regional programs.

Recommendation #2:

Develop and implement a public education curriculum for opportunities to increase energy literacy.

— Corresponds to the EFC Objectives:

- Raise public awareness, and assure Missouri citizens have timely access to reliable information about how energy choices are related to environmental and economic quality of life.
- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.
- Recognize outstanding achievements and develop other incentives that encourage voluntary advancement of energy efficiency, appropriate technology and renewable-energy resources in the state of Missouri.

— Corresponds to the EFC Interim Recommendation:

- Evaluate the public education curriculum for opportunities to increase energy literacy. For example, consider implementing all or part of the “Report and Recommendations of the Governor’s Task Force on Environmental Education: Creating an Environmentally Literate Citizenry.”

— Corresponds to the 1992 Study Recommendations:

- Organize activities to promote an increase in the general awareness and appreciation of energy resource issues.
- Develop programs within individual communities to promote energy efficiency.
- Focus the expertise of the state’s energy-related organizations to communicate technical energy information to consumers.

— Corresponds to the *HCR 16* Recommendations:

- Develop effective strategies to give Missourians from all sectors access to reliable and usable energy information.
- Support and encourage programs that promote energy efficiency such as the Home Energy Rating Systems, Green Builder Councils, and training and certification programs. Encourage the transfer of successful experiences by recognizing and promoting effective local and regional programs.

Recommendation #3:

Develop a program of performance indicators to evaluate progress toward energy-related goals arising from the state's energy policy.

— Corresponds to the EFC Objective:

- Recognize outstanding achievements and develop other incentives that encourage voluntary advancement of energy efficiency, appropriate technology and renewable-energy resources in the state of Missouri.

— Corresponds to the EFC Interim Recommendation:

- Develop a program of performance indicators to evaluate progress toward energy-related goals arising from the state's energy strategy.

— Corresponds to *1992 Study* Recommendation:

- Organize activities to promote an increase in the general awareness and appreciation of energy resource issues.

— Corresponds to the *HCR 16* Recommendation:

- Develop effective strategies to give Missourians ... access to reliable and usable energy information.

Recommendation #4:

Develop a decision-making process that assigns the responsibility for collecting, analyzing and applying new energy data into decision-making processes, building on such foundations as the 1992 energy study.

— Corresponds to the EFC Objective:

- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.

— Corresponds to the EFC Interim Recommendation:

- Support and inform state and other policy and program decisions with the best currently available information and analyses. Develop a system for collecting and integrating new data and analyses into decision-making processes, building on such foundations as the 1992 Energy Study.

— Corresponds to the 1992 Study Recommendations:

- Develop programs within individual communities to promote energy efficiency.
- Focus the expertise of the state's energy-related organizations to communicate technical energy information to consumers.

— Corresponds to the HCR 16 Recommendations:

- Develop effective strategies to give Missourians from all sectors access to reliable and usable energy information, including a method to assure access to reliable building energy audits and analysis for all building owners or tenants.
- Support and encourage programs that promote energy efficiency such as the Home Energy Rating Systems, Green Builder Councils, and training and certification programs. Encourage the transfer of successful experiences by recognizing and promoting effective local and regional programs.

Recommendation #5:

Encourage the development of promotional programs for energy efficiency in both public and private sectors.

— Corresponds to the EFC Objectives:

- Raise public awareness, and assure Missouri citizens have timely access to reliable information about how energy choices are related to environmental and economic quality of life.
- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.
- Recognize outstanding achievements and develop other incentives that encourage voluntary advancement of energy efficiency, appropriate technology and renewable-energy resources in the state of Missouri.

— Corresponds to the EFC Interim Recommendation:

- Encourage the promotion of energy efficiency in both the public and private sectors.

— Corresponds to the 1992 Study Recommendations:

- Organize activities to promote an increase in the general awareness and appreciation of energy resource issues.
- Develop programs within individual communities to promote energy efficiency.
- Focus the expertise of the state's energy-related organizations to communicate technical energy information to consumers.

— Corresponds to the HCR 16 Recommendations:

- Develop effective strategies to give Missourians from all sectors access to reliable and usable energy information, including a method to assure access to reliable building energy audits and analysis for all building owners or tenants.
- Support and encourage programs that promote energy efficiency such as the Home Energy Rating Systems, Green Builder Councils, and training and certification programs. Encourage the transfer of successful experiences by recognizing and promoting effective local and regional programs.

Appendix A: Policy Comparisons

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Part II. Transportation

Recommendation #1:

Establish an interagency process to coordinate the efforts of state agencies, transportation-planning organizations and public transportation providers in transportation planning and decision-making.

— Corresponds to the EFC Objective:

- Coordinate the efforts of state agencies, transportation-planning organizations and public transportation providers in transportation planning and decision-making.

— Corresponds to the EFC Interim Recommendation:

- Establish and administer an interagency review process for all state departments that are responsible for transportation investments, transportation-planning organizations and public transportation providers.

— Corresponds to the 1992 Study Recommendations:

- Increase the state's commitment to developing a fully functional multi-modal transportation system:
 - Direct additional funding to the development, operation and promotion of transit alternatives;
 - Develop rural transit alternatives;
 - Increase the frequency and improve the operation of passenger rail service;
 - Focus commercial transit funding on the development of multi-modal transportation systems to integrate the state's movement of freight via rail, water and trucks; and
 - Require an energy usage assessment before undertaking new road and highway construction.

— Corresponds to the HCR 16 Recommendation:

- No direct recommendation offered.

Recommendation #2:

Identify and implement the use of energy-related performance indicators to develop transportation programs for Missouri and require their use in the interagency coordination process.

— Corresponds to the EFC Objective:

- Identify performance indicators, set up the required data collection processes to track the indicators and develop goals.

— Corresponds to the EFC Interim Recommendations:

- Develop a list of transportation-related energy performance indicators.
- Collect and analyze any existing data and make it available for the interagency review process. Develop any additional databases deemed necessary and appropriate to support the state interagency review process relevant to the identified performance indicators.
- Establish numerical goals for transportation-related energy performance indicators.

— Corresponds to the 1992 Study Recommendation:

- No direct recommendation offered.

— Corresponds to the HCR 16 Recommendation:

- No direct recommendation offered.

Recommendation #3:

Establish uniform methods for determining the full public and private costs and benefits of proposed transportation investments.

— Corresponds to the EFC Objective:

- Establish uniform methods for determining the full costs and benefits of proposed transportation investments.

— **Corresponds to the EFC Interim Recommendation:**

- Establish uniform methods for determining the full costs and benefits of proposed transportation investments.

— **Corresponds to the 1992 Study Recommendation:**

- Reflect true cost of private vehicle usage:
 - Join with other states to have motor fuel costs reflect the full cost of transportation;
 - Link non-fuel costs to miles driven whenever feasible; and
 - Increase the cost of parking as an incentive to encourage transit alternatives.

— **Corresponds to the HCR 16 Recommendation:**

- No direct recommendation offered.

Recommendation #4:

Educate the citizens of Missouri regarding the opportunities and value of making energy-efficient transportation decisions.

— **Corresponds to the EFC Objective:**

- Take advantage of opportunities for creating an awareness of energy-efficiency concerns in transportation decision-making throughout the state of Missouri.

— **Corresponds to the EFC Interim Recommendation:**

- Educate the citizens of Missouri regarding the opportunities and value of making energy-efficient transportation decisions.

— **Corresponds to the 1992 Study Recommendation:**

- Provide more energy-efficient transportation choices to the citizens of Missouri:
 - Promote car and van pooling;

Appendix A: Policy Comparisons

- Require automobile manufacturers and/or dealers to provide information to consumers on the life-cycle costs of operating both new and used automobiles and trucks; and
- Establish programs to assist employers with the development of telecommunication systems aimed at reducing transportation requirements.

— **Corresponds to the *HCR 16* Recommendation:**

- No direct recommendation offered.

Recommendation #5:

Develop and implement guidelines to ensure public participation in transportation decisions.

— **Corresponds to the EFC Objectives:**

- Establish a process for meaningful public participation in transportation decision-making.
- Take advantage of opportunities for creating an awareness of energy-efficiency concerns in transportation decision-making throughout the state of Missouri.

— **Corresponds to the EFC Interim Recommendations:**

- Where necessary, develop and implement guidelines to ensure public participation in transportation decision-making; and
- Educate the citizens of Missouri regarding the opportunities and value of making energy-efficient transportation decisions.

— **Corresponds to the *1992 Study* Recommendation:**

- No direct recommendation offered.

— **Corresponds to the *HCR 16* Recommendation:**

- No direct recommendation offered.

Recommendation #6:

The state shall adopt and fund a comprehensive transportation policy that has as its objective improved public access to people, places, jobs, goods and services that result in greater transportation energy efficiency.

— Corresponds to the EFC Objective:

- No direct objective offered.

— Corresponds to the Interim EFC Recommendation:

- No direct recommendation offered.

— Corresponds to the 1992 Study Recommendations:

- Increase the state's commitment to developing a fully functional multi-modal transportation system:
 - Direct additional funding to the development, operation and promotion of transit alternatives;
 - Develop rural transit alternatives;
 - Increase the frequency and improve the operation of passenger rail service;
 - Focus commercial transit funding on the development of multi-modal transportation systems to integrate the state's movement of freight via rail, water and trucks; and
 - Require an energy usage assessment before undertaking new road and highway construction.
- Develop an array of mechanisms to maximize the energy efficiency of land use and urban designs.
 - Require construction and transportation projects to provide a transportation impact assessment in order to receive government support; and
 - Provide incentives for businesses to locate so as to minimize total energy requirements for transportation.

Appendix A: Policy Comparisons

— Corresponds to the *HCR 16* Recommendation:

- No direct recommendation offered.

Part III. Residential, Institutional, Commercial & Industrial Facilities

Recommendation #1:

Missouri should adopt building codes based on life-cycle costing that establish cost-effective minimum energy-efficiency standards for new residential and commercial facilities.

— Corresponds to the EFC Objective:

- Encourage life-cycle costing when considering building operation and design.

— Corresponds to the EFC Interim Recommendation:

- Encourage, but not mandate, life-cycle costing methodologies for non-state buildings.

— Corresponds to the 1992 Study Recommendations:

- Adopt energy-efficiency standards for Missouri buildings.
- Aggressively promote the usage of proven high-efficiency, cost-effective building technologies and applications.

— Corresponds to the HCR 16 Recommendations:

- Adopt a state-specific residential energy standard, equivalent to MEC 92, that provides two alternatives for compliance: a prescriptive path and a “points-based” path.
- Adopt a state-specific commercial energy standard based on ASHRAE Standard 90.1-1989 that provides two alternatives for compliance: a prescriptive path and a “trade-off” path.
- Develop energy-efficiency standards for manufactured housing.

Recommendation #2:

Apply life-cycle costing methodologies in state government in the design and/or retrofit of energy systems and buildings and share the lessons learned with other public and private organizations.

— Corresponds to the EFC Objective:

- Encourage life-cycle costing when considering building operation and design.

— Corresponds to the EFC Interim Recommendations:

- Continue support of life-cycle costing methodologies and existing mandates for state buildings.
- Encourage, but not mandate, life-cycle costing methodologies for non-state buildings.

— Corresponds to the 1992 Study Recommendations:

- Develop Missouri's state and local governments into visible leaders in successful energy management of their owned and leased buildings.
- Develop Missouri's state and local governments into visible leaders in promoting energy efficiency in equipment procurement and usage.

— Corresponds to the HCR 16 Recommendations:

- Adopt a state-specific residential energy standard, equivalent to MEC 92, that provides two alternatives for compliance: a prescriptive path and a "points-based" path. (*Note: This applies to some state facilities.*)
- Adopt a state-specific commercial energy standard based on ASHRAE Standard 90.1-1989 that provides two alternatives for compliance: a prescriptive path and a "trade-off" path.

Recommendation #3:

Support the development of a Missouri Home Energy Rating System / Energy Efficiency Financing Program (HERS/EEF) as a market-based strategy to encourage energy savings and efficiency in the residential sector. Expand, if appropriate, to provide energy-efficiency financing options in the commercial and industrial sectors.

— Corresponds to the EFC Objective:

- Support educational efforts rather than mandatory efforts for energy efficiency in buildings.

— Corresponds to the EFC Interim Recommendations:

- Support the development of a state residential energy rating system involving both the public and private sectors.
- Support the development and implementation of energy-efficient mortgages in Missouri.
- Examine the potential for energy-efficiency financing programs in the commercial and industrial sectors.

— Corresponds to the 1992 Study Recommendations:

- Improve the availability and quality of energy information to building owners, operators and tenants.
- Improve the energy awareness and technical ability of construction-related professionals.
- Aggressively promote the usage of proven high-efficiency, cost-effective building technologies and applications.
- Aggressively promote the usage of proven high-efficiency, cost-effective equipment technologies and applications.
- Increase the commitment of the private sector toward efficient equipment operations, repair and maintenance.
- Increase the awareness and adoption of residential-equipment efficiency opportunities.

Appendix A: Policy Comparisons

- Provide financing resources for increased energy efficiency in new and existing buildings.
- Develop state and local government sources of energy investment financing.
- Provide financing resources for increased energy efficiency in new and existing equipment.

— Corresponds to the *HCR 16* Recommendations:

- Adopt a statewide home energy rating system based on the residential energy standard, and use the standard as an equivalent substitute for MEC 92 for builders, home buyers and lenders participating in HUD/DoA-backed mortgage programs.
- Support and encourage programs that promote energy efficiency such as the Home Energy Rating Systems (HERS), Green Builder Councils, and training and certification programs. Encourage the transfer of successful experiences by recognizing and promoting effective local and regional programs.
- Develop an effective variety of specific financing mechanisms for energy-efficiency investments.

Recommendation #4:

Build on the labeling provisions of the Energy Policy Act to support a voluntary national effort for improved energy-efficiency labeling of appliances.

— Corresponds to the EFC Objective:

- Support educational efforts rather than mandatory efforts for energy efficiency in buildings.

— Corresponds to the EFC Interim Recommendation:

- Support a voluntary national effort for improved energy-efficiency labeling of appliances.

— Corresponds to the *1992 Study* Recommendations:

- Improve the availability and quality of energy information to building owners, operators and tenants.

Appendix A: Policy Comparisons

- Aggressively promote the usage of proven high-efficiency, cost-effective equipment technologies and applications.
- Increase the commitment of the private sector toward efficient equipment operations, repair and maintenance.
- Increase the awareness and adoption of residential equipment-efficiency opportunities.
- Maintain and disseminate up-to-date information resources on the most promising emerging energy applications and technologies.

— **Corresponds to the *HCR 16* Recommendation:**

- No direct recommendation offered.

Recommendation #5:

Support the development and coordination of state resources to assist low-income families in making their homes more energy-efficient and in the purchase of energy for their homes.

— **Corresponds to the EFC Objective:**

- Support energy services for low-income households.

— **Corresponds to the EFC Interim Recommendations:**

- Develop a strategy of support for low-income households to assist in weatherization of their homes and purchase of needed home energy.
- Examine the development of state resources for both the Low-Income Weatherization Assistance Program and the Low-Income Home Energy Assistance Program.

— **Corresponds to the *1992 Study* Recommendation:**

- Improve the delivery of energy services to low-income families.

— Corresponds to the *HCR 16* Recommendation:

- No direct recommendations offered.

Recommendation #6:

Throughout the transition to a deregulated or less-regulated power industry in Missouri and regionally, the state should act to protect the public interest.

— Corresponds to the EFC Objectives:

- Encourage broad, well-informed public participation in state and local energy decision-making processes and programs.
- Support energy services for low-income households.
- Create an environment in Missouri that nurtures the development of those alternative- and renewable-energy supplies that provide our state the greatest competitive advantage, economically and environmentally.

— Corresponds to the EFC Interim Recommendation:

- Investigate the potential for electric generation using renewable-energy sources and examine new technology.

— Corresponds to the *1992 Study* Recommendation:

- No direct recommendations offered.

— Corresponds to the *HCR 16* Recommendation:

- No direct recommendations offered.

Part IV. Alternative- and Renewable-Energy Supplies

Recommendation #1:

Purchase and use alternative and renewable motor vehicle fuels in state government and share lessons learned with other public and private fleet managers.

— Corresponds to the EFC Objectives:

- Create an environment in Missouri that nurtures the development of those alternative- and renewable-energy supplies that provide our state the greatest long-term competitive advantage, economically and environmentally.
- Assess the relative practicality of alternative- and renewable-energy sources in our region, including consideration of life-cycle costs, macro-economic impacts and environmental concerns.

— Corresponds to the EFC Interim Recommendations:

- Make alternative and renewable fuels a priority in state agency fleet management plans, with emphasis on Missouri-based resources.
- Develop and implement life-cycle costing methodology that includes all economic activities, both positive and negative, when making energy supply decisions.
- Develop the means to provide information and training to Missouri public and private fleet managers on renewable/alternative fuels.

— Corresponds to the 1992 Study Recommendations:

- Develop Missouri's state and local governments into visible leaders in promoting efficiency in the transportation sector.
- Require the State government fleet to include alternative-fuel vehicles.

— Corresponds to the *HCR 16* Recommendation:

- Ensure the development of an alternative-fuels infrastructure that significantly contributes to the economic and environmental betterment of Missouri, and support the conversion of vehicles to alternative fuels.

Recommendation #2:

Increase domestic state energy production by increasing and optimizing the use of solar, wind, biomass, hydro and alternative sources of power, and their supporting technologies, with first priority on Missouri resources where they provide same or lower-cost power.

— Corresponds to the EFC Objectives:

- Create an environment in Missouri that nurtures the development of those alternative- and renewable-energy supplies that provide our state the greatest long-term competitive advantage, economically and environmentally.
- Assess the relative practicality of alternative- and renewable-energy sources in our region, including consideration of life-cycle costs, macro-economic impacts and environmental concerns.
- Focus priority on energy sources that are indigenous to Missouri.

— Corresponds to the EFC Interim Recommendations:

- Investigate the potential for electric generation using renewable-energy sources and examine new technology.
- Identify opportunities for Missouri industries to utilize by-product and waste materials for production of process heat and hydrocarbon products that would otherwise use fossil fuels.
- Investigate the commercialization of process heat technologies that utilize alternative and renewable fuels.
- Develop the means to evaluate alternative applications, cost-effectiveness and feasibility of alternative and renewable fuels.

Appendix A: Policy Comparisons

- Develop the means to commercialize alternative/renewable fuels.

— Corresponds to the 1992 Study Recommendations:

- Adopt regulatory changes aimed at increasing the incentives and capabilities for utilities to pursue energy-efficiency strategies:
 - Evaluate the use of small-scale district energy systems for industrial parks and housing developments.
- Develop Missouri's state and local governments into visible leaders in promoting the use of renewable-energy resources:
 - Develop a biomass energy strategy for the State of Missouri;
 - Develop an energy-based crop strategy for the State of Missouri; and
 - Require the use of renewable-energy sources on government installations.
- Establish public-private partnerships to promote the development and commercialization of additional renewable-energy resources:
 - Use public-private resources for the evaluation and commercialization of renewable-energy resources.
- Coordinate the activities of the public, academic and private sectors to commercialize energy-efficiency technologies.*
 - Coordinate energy research efforts;
 - Provide non-technical support services to assist with the adoption of new technologies; and
 - Institute an economic development program aimed at promoting alternative resources.

Appendix A: Policy Comparisons

- Maintain and disseminate up-to-date information resources on the most promising emerging energy applications and technologies.*
 - Create an "inventory" to identify currently available and emerging energy applications and technologies.

*(*Note: These two groups of recommendations/action items were listed as "not grouped under a section of the EFC report" in the Composite List because they were listed under the heading "Promote Development and Commercialization of Energy-Efficiency Industries." In fact, these actions are needed in the development of the alternative/renewable-energy industry and were discussed by the subcommittee, so they are listed here.)*

— Corresponds to the *HCR 16* Recommendation:

- No direct recommendation offered.

Appendix B:

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Appendix C:

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Appendix D:

History and Organization

History and Background of the Energy Futures Coalition

May 1992 — Statewide Energy Study Recommendation

In 1991 and 1992, the Missouri Department of Natural Resources conducted a study of all aspects of energy supply and use in Missouri. The study was coordinated by the Environmental Improvement and Energy Resources Authority with support from the Division of Energy. The results were released in May 1992 as the *Missouri Statewide Energy Study*. This report documented that in 1990 Missourians spent approximately \$10 billion on all of their energy needs, which represented nearly 11 percent of the total income for the state. Since Missouri must import most of the energy it uses, most of these expenditures leave the state's economy. The study makes the case that efficiency in our energy consumption allows more of our income to remain in the state and reduces environmental pollution. One of the major recommendations of the study was to create an Energy Futures Coalition to build a foundation to promote a sustainable energy future for Missouri.

December 1993 — HCR 16 Report (*Economic Opportunities Through Energy Efficiency*)

With the findings of the *Missouri Statewide Energy Study* as a foundation and the impetus from Congress in the form of the Energy Policy Act of 1992, the Missouri General Assembly passed House Concurrent Resolution 16 (HCR 16) in April 1993. This resolution, which directs the Environmental Improvement and Energy Resources Authority, the Division of Energy and the Office of Administration to analyze the obligations of the Energy Policy Act of 1992 on Missouri and to further analyze energy-efficiency standards for buildings, was released in December 1993 in a *Report to the Missouri Legislature Pursuant to House Concurrent Resolution 16: Economic Opportunities Through Energy Efficiency and the Energy Policy Act of 1992*.

March 2, 1994 — Governor's Executive Order 94-10

Building on the *Statewide Energy Study* and the HCR 16 report, Governor Carnahan issued an Executive Order (94-10) in March 1994 establishing the Energy Futures Coalition. The primary role of the Energy Futures Coalition is to serve in an advisory capacity to the Governor and develop a consensus for recommendations and priorities upon which others may act to create a sustainable energy future for Missouri. The Coalition is to assure that citizens of Missouri are kept informed on progress toward a more energy-efficient future. The Governor appointed 29 members to the Coalition (four members were added later) in the summer of 1994.

Appendix D: History and Organization

Organization of the Coalition

The Coalition first met in October 1994. A seven-person Executive Committee was formed consisting of the chair, the vice-chair, the four subcommittee chairs and one other member. Four subcommittees were formed:

- Education, Information, Marketing and Incentives
- Transportation
- Residential, Institutional, Commercial and Industrial Facilities
- Alternative- and Renewable-Energy Supplies

The Coalition has been staffed by the Department of Natural Resources' Division of Energy with assistance from the Environmental Improvement and Energy Resources Authority, the Missouri Highway and Transportation Department and the Department of Economic Development.

Meetings of the Coalition

The following is a list of the meeting dates of the Coalition since its formation by Governor's Executive Order 94-10 on March 2, 1994:

<u>Date</u>	<u>Location</u>
October 4, 1994	Initial Meeting, Jefferson City
December 6, 1994	Columbia
March 7, 1995	Jefferson City
May 18-19, 1995	Columbia
August 28, 1995	Jefferson City
October 3, 1995	Jefferson City
October 25, 1995	Presentation of Interim Report to the Governor, Jefferson City
December 5, 1995	Jefferson City
June 27, 1996	Jefferson City
July 26, 1996	Jefferson City
August 13, 1996	Jefferson City
September 5, 1996	Jefferson City
February 18, 1997	Presentation of Final Report to the Governor, Jefferson City

Appendix E:
Organizations Cited in the Report

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Alliance to Save Energy
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Washington, D.C. 20006
Phone: (202) 857-0666
Fax: (202) 331-9588

Alternative Fuels Data Center
P.O. Box 12316
Arlington, VA 22209
Phone: (800) 423-4363 (IDOE)
Fax: (703) 528-1953

**American Society of Heating, Refrigerating,
and Air-Conditioning Engineers**
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Associated Electric Cooperative Inc.
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California State Department of Transportation
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Project Planning and Design**
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Center for Science and Education

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Committee to Keep Missourians Warm

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Community Environmental Council Inc.

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Council of American Building Officials

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East-West Gateway Coordinating Council

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Energy Clearinghouse

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Energycare, St. Louis

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Farmers' Home Administration - (Now Called:

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Mid-America Energy Resources Partners

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Mid-America Regional Council

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600 Broadway
Kansas City, MO 64105-1536
Phone: (816) 474-4240
Fax: (816) 421-7758

Midwest Research Institute

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Missouri Association for Community Action Inc.

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Missouri Automobile Dealers Association

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Fax: (573) 634-5187

Missouri Commission on Global Climate Change and Ozone Depletion c/o Missouri General Assembly:

Missouri Senate

State Capitol
Jefferson City, MO 65101
Phone: (573) 751-3766
Fax: (573) 751-2745

Missouri House of Representatives

State Capitol
Jefferson City, MO 65101
Phone: (573) 751-3829
Fax: (573) 751-0940

Missouri Committee for Model Codes

Mr. Gerald Borgstadt, Chair
City of Springfield
840 Boonville
Springfield, MO 65802
Phone: (417) 864-1060
Fax: (417) 864-1057

Missouri Corn Growers' Association

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Appendix E: Organizations Cited

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Missouri Department of Conservation

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Missouri Department of Conservation, Office of Environmental Education

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Fax: (573) 526-4496

Missouri Department of Corrections

2729 Plaza Drive
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Jefferson City, MO 65102-0236
Phone: (573) 751-2389
Fax: (573) 751-4099

Missouri Department of Economic Development

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Missouri Department of Natural Resources

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Missouri Department of Natural Resources, Division of Energy

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Missouri Department of Natural Resources, Division of Energy

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Missouri Department of Natural Resources, Division of Environmental Quality

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Appendix E: Organizations Cited

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**Missouri Department of Natural Resources,
Environmental Improvement and
Energy Resources Authority**

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**Missouri Department of Social Services,
Division of Family Services -Central Office**

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Phone: (573) 751-3221
Fax: (573) 751-8984

Missouri Department of Transportation

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**Missouri Department of Transportation,
Customer Service Center**

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Fax: (573) 526-2484

**Missouri Department of Transportation,
Plan Scoping Division**

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Jefferson City, MO 65102
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**Missouri Ethanol and Other
Renewable Fuels Commission**

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Missouri General Assembly:

Missouri Senate

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Missouri House of Representatives

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Appendix E: Organizations Cited

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Missouri National Guard

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Missouri Office of Administration, Division of Design and Construction

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Missouri Oil Council

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Missouri Propane Education and Research Council

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Missouri Public Service Commission

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Fax: (573) 751-1847

Missouri State Highway Patrol, Headquarters (Department of Public Safety)

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Fax: (573) 751-9419

National Association of Regulatory Utility Commissioners

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Fax: (202) 898-2213

National Association of State Energy Officials

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National Consumer Law Center

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National Ethanol Vehicle Coalition

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National Governors' Association

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Appendix E: Organizations Cited

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Nebraska Natural Resources Committee

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New York City Housing Authority

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Oak Ridge National Laboratory

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Pacific Northwest Laboratories

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Pattonville High School

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Pennsylvania Department of Transportation

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Pennsylvania Turnpike Commission

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Appendix E: Organizations Cited

Rebuild America Coalition

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Sierra Club - Ozark Chapter

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Southeast Regional Biomass Energy Program

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Springfield City Utilities

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Surface Transportation Policy Project

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Fax: (202) 939-3475

Sustainable St. Louis

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Fax: (314) 773-1940 (Call first)

Sustainable Seattle

909 4th Avenue
Seattle, WA 98104
Phone: (206) 382-5013 Ext. 5072
Fax: (206) 382-7894

Texas Sustainable Development Council

1700 North Congress Avenue
Stephen F. Austin Building, Room 620
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Phone: (512) 305-8989
Fax: (512) 463-5233

Total Transportation Commission

Liaison - Missouri Department of Transportation
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Jefferson City, MO 65102-0270
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Union Electric Company

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Bureau of the Census**
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U.S. Department of Energy
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**U.S. Department of Energy,
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**U.S. Department of Energy,
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**U.S. Department of Energy,
Office of Science Education
and Technical Information**
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Fax: (202) 586-2931

**U.S. Department of Housing
and Urban Development**
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Fax: (202) 619-8257

U.S. Department of Transportation
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Washington, D.C. 20590
Phone: (202) 366-1111
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U.S. Environmental Protection Agency
401 M Street, SW
Washington, D.C. 20460
Phone: (202) 260-4700
Fax: (202) 260-0279

U.S. Postal Service
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Appendix E: Organizations Cited

University of Missouri - Rolla

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Vermont Housing Finance Agency

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Virginia Citizen Action

6 North 6th Street, Suite 403
Richmond, VA 23219
Phone: (804) 643-6713
Fax: (804) 643-6829

Wisconsin Department of Transportation

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Madison, WI 53707-7913
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Appendix F:

Glossary of Terms Used in the EFC Final Report

Appendix F: Glossary of Terms

Active solar system: A system that captures and converts solar energy into heat or electricity by use of an intermediate substance or mechanism such as heating water or photovoltaic cells.

Agroforestry Program: A program established by the Missouri Economic Diversification and Afforestation Act of 1990 (amended in 1993), the major intent of which is to provide incentives to landowners to use agroforestry practices on their lands, to ensure soil conservation and to build a diversified economic base in rural Missouri. State rental payments would be made to landowners for a 10-year period on lands that are currently in the federal Conservation Reserve Program (CRP) once the federal contract expires. Agroforestry refers to the growing of grain and forage crops in conjunction with trees, usually in alternating rows following natural land contours.

Alternative energy: Alternative energy is described differently depending on the sector using the energy. See "Alternative and renewable motor-vehicle fuels" below. When considering energy for non-transportation uses, renewable energy sources such as wind, solar, geothermal, biomass and hydro are usually considered alternative as well as renewable. In addition, applications of energy technologies that are on-site and/or off-the-grid are considered alternative, such as a fuel cell that can use either fossil natural gas or renewable biogas as its fuel.

Alternative and renewable motor-vehicle fuels: Alternative motor-vehicle fuels include methanol and ethanol mixtures containing 85 percent or more by volume of methanol or ethanol mixed with gasoline or other fuels, compressed/liquid natural gas, liquefied petroleum gas (also called propane or LP), and electricity. These fuels are discussed in both the Clean Air Act Amendments of 1990 and the National Energy Policy Act of 1994. Renewable fuels are those fuels derived from other than fossil fuel feedstocks. This leads to some complexity. Methanol is alternative, but not renewable, if it is produced from methane that comes from a fossil source like natural gas or coal. However, if the methanol is derived from wood, it is both an alternative and a renewable fuel. Biodiesel, diesel made from oilseeds or used vegetable oils, is renewable, but not at this time considered to be an alternative fuel except at a 100-percent concentration.

American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE): The Society is organized and operated for the exclusive purpose of advancing the arts and sciences of heating, refrigeration, air conditioning and ventilation, the allied arts and sciences and related human factors for the benefit of the general public. ASHRAE is a source of technical and educational information, standards and guidelines, providing for professional growth. (See Appendix E for address.)

Americans with Disabilities Act (ADA): This federal act gives civil rights protections to individuals with disabilities similar to those provided to individuals on the basis of race, color, sex, national origin, age and religion. It guarantees equal opportunity for individuals with disabilities in public accommodations, employment, transportation, state and local government services, and telecommunications.

Barrel (of oil): The standard measurement in the oil industry. A barrel of oil equals 42 U.S. gallons. The measurement originates from the wooden barrels used to transport oil in the early days of oil production.

Appendix F: Glossary of Terms

Biogas: Gas resulting from the anaerobic (without oxygen) digestion of organic materials. This gas usually consists of a mix of 40 to 80 percent methane, 20 to 60 percent carbon dioxide and 0 to 5 percent minor gases such as carbon monoxide, in addition to various nitrogen and sulphur compounds.

Btu (British thermal unit): A standard measure of heat content in a substance that can be burned to provide energy, such as oil, gas or coal. One Btu equals the amount of energy required to raise the temperature of one pound of water one degree Fahrenheit at, or near, 39.2 degrees Fahrenheit, about the amount of heat of one kitchen match.

Clean Air Act Amendments of 1990 (CAAA): The basis for the national air pollution control program, with the main objective of implementing pollution control measures such that all areas of the country achieve compliance with National Ambient Air Quality Standards. Some of the goals of the CAAA include: (1) Reducing emissions of the six criteria air pollutants (ground level ozone, carbon monoxide, nitrogen dioxide, particulate matter, sulfur dioxide and lead); (2) Reducing emissions of toxic air pollutants; (3) Reducing acid rain; and (4) Protecting the stratospheric ozone layer.

Cogeneration production plant: A power plant that produces electricity at the owner's expense and uses the heat that would otherwise be wasted for industrial processes or to heat buildings. This setup results in a greater efficiency of energy use.

Congestion Mitigation and Air Quality Improvement Program: Directs funds from the Federal Highway Administration toward transportation projects in Clean Air Act non-attainment areas for ozone and carbon monoxide. These projects will contribute to meeting the attainment of national ambient area air quality standards. If a state has none of these non-attainment areas, the funds may be used as if they were Surface Transportation Program projects.

Conservation Reserve Program (CRP): Established in the Food Security Act of 1985, Title XII, Subtitle D, Section 1231-1245. A federal program that pays an annual rent for 10 years to landowners who plant a perennial cover on acres that are highly erodible. Originally, the emphasis was on erosion control and surplus commodity reduction. The 1995 farm bill puts more emphasis on water quality and wildlife habitat concerns.

Council of American Building Officials Model Energy Code: The provisions of this code regulate the design of building envelopes, the design and selection of mechanical, electrical, service water heating and illumination systems and equipment that will enable effective use of energy in new residential construction.

DNR open houses (a.k.a. "town meetings"): A series of informative and educational town-hall meetings held in Missouri communities to share information about the Missouri Department of Natural Resources and various energy, environmental, geologic and state park issues of interest and concern to Missouri residents.

E-10: A liquid motor fuel, also known as "gasohol," consisting of 10 percent fuel ethanol and 90 percent unleaded gasoline.

Appendix F: Glossary of Terms

E-85: A liquid motor fuel consisting of 85 percent fuel ethanol and 15 percent unleaded gasoline.

Earth Day: An annual celebration, usually on or around April 22, incorporating educational exhibits and activities dealing with energy and environmental events and themes.

Energy Efficiency in State Facilities Program: The General Assembly began the Energy Efficiency in State Facilities Program, established by House Bill 195 and Senate Bill 80 in 1993 (Sections 8.800-8.851, RSMo) to reduce state government utility expenditures through encouraging or mandating cost-effective energy-efficiency and renewable-energy sources in state facilities.

Energy Extension Service (EES): A federal energy program created by the National Energy Extension Act (Title V of Public Law 95-39) in June 1977 to assist small-scale energy consumers in using energy more efficiently. The objectives of the Energy Extension Service were to: (1) Increase the capability of small-scale energy users to make and implement informed energy decisions; (2) Connect these energy users with practical conservation and renewable resource options available to them; and (3) Assist states through federal grants and technical support to develop and implement EES programs to deliver services tailored to the needs of small-scale energy users.

Energy Information Resource Center (EIRC): The Department of Natural Resources' Division of Energy created the EIRC in FY96 and continues to develop its capacity to serve. The center assures every citizen, including policy decision-makers, timely access to consumer, technical, economic and policy information about energy efficiency and renewable energy. In FY97, the center will continue its progress toward (1) Creating two-way links with national and regional databases and other information resources; (2) Encouraging public and privately-sponsored projects that create and disseminate quality energy awareness and technical information; (3) Encouraging public and privately-sponsored projects that undertake technical, economic and policy data collection, analysis and reporting; and (4) Making referrals and taking other steps to assure broad public access to information in the medium most useful to individuals and organizations.

Energy Savings Performance Contracting (ESPC): Also known as "Shared Energy Savings Contracting," this is an alternative to the traditional method of financing energy-efficiency improvements in buildings. For state buildings, the traditional method of financing energy efficiency is through state appropriation of capital improvement funds. Under this alternative financing arrangement, agencies contract with energy-service companies (ESCO), which may conduct and pay all or part of the up-front costs for building energy-efficiency audits, prioritizing energy-efficiency upgrade needs, and acquiring, installing, operating, and maintaining the energy-efficiency equipment. In exchange, the ESCO receives a payment, usually from the cost savings resulting from these improvements, until the contract period expires. At that time, the facility retains all the savings and equipment. The key benefits of ESPC are that it does not compete with other state priorities such as emergency or routine maintenance and repair, reduces energy costs, improves energy efficiency, eliminates the maintenance and repair costs of aging or obsolete energy-consuming equipment, may place the operations and maintenance responsibilities on the contractor, and stimulates the economy by allowing energy service companies to profit from their up-front investments in buildings by receiving a share of the utility bill savings.

Appendix F: Glossary of Terms

Energy Policy Act of 1992 (EPACT): Federal legislation signed into law by President Bush on October 24, 1992, and considered the most comprehensive energy bill adopted by the U.S., EPACT contains numerous substantive initiatives intended to assure sustainable economic development in a manner that reflects sensitivity to global environmental concerns. Major provisions of this legislation establish important energy-efficiency standards, encourage greater competition in electricity generation, establish new licensing procedures for nuclear power plants and nuclear waste repositories, and provide tax incentives for domestic energy production and conservation. Relatively few of EPACT's provisions are aimed directly at reducing oil imports, with the principal exception being the alternative transportation-fuel provisions. Electric utilities, which consume relatively little oil, are a primary focus of the final statute.

Energy Star computers program: This is a partnership program sponsored by the Environmental Protection Agency with industry-leading manufacturers. "Energy Stars" are energy-efficient computers, monitors, and printers that save energy by powering down and going to "sleep" when not being used. An Energy Star computer has all the performance features of a regular computer, but has the additional ability to "power-down." These energy-efficient computers save money on electricity bills and reduce pollution.

Environmental Impact Statement (EIS): A report required by the National Environmental Protection Act, P.L. 91-190 as amended, 42USC4321, for a project that is federal or federally funded and that analyzes, for public comment, numerous possible environmental, economic and sociological effects that may result from conducting or building the proposed project. The intent of an EIS is to provide a mechanism for a thorough review of an anticipated project and thus identify means to avoid or minimize unintended environmental and other damages.

Ethanol (C_2H_5OH): An alcohol usually made from corn, but which can be made from a wide variety of plant feedstocks including sugar cane, sugar beets, milo, sorghum, grass and wood. It is used in a very pure form as a fuel additive and octane enhancer.

Fannie Mae: Created by Congress in 1938 as the Federal National Mortgage Association, and now a shareholder-owned, congressionally chartered corporation, it is the largest source of residential mortgage funds in the United States, providing a secondary market for mortgage loans. Fannie Mae purchases residential home loans from mortgage lending institutions, thereby replenishing their supply of mortgage funds available for lending.

Federal ozone standard (part of the National Ambient Air Quality Standards): The Clean Air Act Amendments of 1990 (CAAA) require states with areas that are not in compliance with the National Ambient Air Quality Standards (which established specific air-quality requirements) to develop state implementation plans (SIPs) to bring those areas into compliance. The noncomplying areas are called "nonattainment areas," and the CAAA classifies the ozone nonattainment areas by magnitude of noncompliance. There are five classifications of nonattainment: Marginal, Moderate, Serious, Severe and Extreme.

Appendix F: Glossary of Terms

Fossil fuels: Fuels that originated from the remains of plant, animal and sea life of previous geologic eras. Crude oil, natural gas, coal, gasoline, propane, shale oil, tar sands, lignite and peat are fossil fuels or are derived from fossil fuels.

Freddie Mac: The Federal Home Loan Mortgage Corporation, a U.S. government corporation with an active secondary mortgage market.

Fuel cell: An electrochemical conversion device that converts chemical energy into electricity similar to the way a battery does. But the fuel cell is different in that the fuel source is external to the conversion device itself. Fuel cells can use a variety of liquid and gaseous fuels: hydrogen, ammonia, natural gas, methane, methanol, ethanol, etc. Fuel cells are very efficient and produce little or no emissions.

Golden Carrot program: This is a partnership program sponsored by the Environmental Protection Agency with utility companies and industry-leading manufacturers. By aggregating a large pool of appliance-rebate money, utilities are giving appliance manufacturers a financial incentive to make the most energy-efficient appliances possible. The flagship "Golden Carrot" appliance is the refrigerator. Under the program, the manufacturer that can build the largest number of the most efficient, chlorofluorocarbon-free refrigerators in the quickest and cheapest way wins the contract. These energy-efficient appliances save money on electric bills and reduce pollution.

Governor's Council on Management and Productivity (COMAP): A commission established by Missouri Governor Carnahan in 1994 to review management in state government, evaluate its strengths and weaknesses, and prescribe reform. Six task forces were developed, and each identified and recommended improvements to the way Missouri state government operates. Review and implementation of these recommendations is ongoing.

Governors' Ethanol Coalition: A national group, founded in 1991 by Governor Ben Nelson of Nebraska, devoted to promoting increased use of ethanol-based fuels because of their environmental and economic benefits. Missouri Governor Mel Carnahan chaired the group in 1996.

Governor's Task Force on Environmental Education: The Governor's Task Force on Environmental Education's purpose is to develop a comprehensive environmental education plan for Missouri. The plan identified environmental issues, addressed coordination of environmental education within Missouri and developed implementation strategies for the delivery of environmental education to Missouri students. The Governor has initiated one of the recommendations by the task force in the establishment of the Office of Environmental Education (OEE), administered by the Department of Conservation.

Green Metro Index: In 1993 and 1994, the World Resources Institute ranked 75 U.S. metropolitan areas using eight metro-wide environmental indicators (unhealthy air quality, moderate air quality, water quality, toxic releases, superfund sites, energy use, mass transit use and motor-vehicle use). These rankings were then combined into a "Green Metro Index." (World Resources Institute. *The 1994 Information Please Environmental Almanac*. Houghton-Mifflin, 1993.)

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Green Index (statewide): The best-known attempt to rank states and their environmental conditions and policies is the *1991-1992 Green Index*. The green index is a set of 256 indicators that measure and rank each state's environmental health. The final green index is the sum of the state's ranks for all 256 indicators, with each indicator carrying equal weight. Missouri ranked 30th. (Hall, Bob and Mary Lee Kerr. *1991-1992 Green Index: A State-by-State Guide to the Nation's Environmental Health*. Island Press, 1991.)

Green pricing: The concept that consumers be given the choice of paying higher prices for environmentally friendly products and services.

Greenhouse gas: A portion of the sunlight that passes through the earth's atmosphere is absorbed by the earth and radiated back into space as infra-red radiation. Greenhouse gases are trace gases (such as water vapor, carbon dioxide, methane, nitrous oxide, etc.) in the earth's atmosphere that block this infrared radiation and warm the atmosphere. This "greenhouse effect" keeps the earth about 60 degrees Fahrenheit warmer than it would be otherwise. Many scientists are concerned that human activities are causing increases in the emissions of these gases (especially carbon dioxide and methane) and that this may lead to changes in the global climate. Most greenhouse gas emissions in the United States are carbon dioxide emissions because of the burning of fossil fuels.

Home Energy Rating System/Energy Efficiency Financing Program (HERS/EEF): This is a collaborative effort that will expand the demand for homes with higher energy efficiency. The rating system is used by homeowners, home buyers, lenders and realtors to compare homes based on their energy use. The principal purpose of a home energy rating system is to calculate a uniform method for rating the energy performance of a residential building. Typically, a home that is designed to meet the criteria set by the Model Energy Code is considered a four-star home. Increased financing can be offered to cover the higher first-cost of energy-efficient homes based on the fact that a homeowner's monthly utility payments will be reduced sufficiently to cover the increased first cost.

House Bill 45: Missouri state legislation (RSMo Sections 414.400-414.417) to reduce fuel consumption by state-owned vehicles (20 percent reduction in fuel consumption by January 1, 1997), improve fleet management and promote the use of alternative fuels. State agencies with more than 15 vehicles are required to purchase alternative-fuel vehicles or convert conventional vehicles to an alternative fuel on the following schedule: 10 percent by July 1, 1996; 30 percent by July 1, 1998; and 50 percent by July 1, 2000. By July 1, 2002, 30 percent of state-owned, alternative-fuel vehicles must operate solely on the alternative fuel.

Housing and Community Development Act of 1992: Requires that the Federal Housing Administration (FHA) conduct energy-efficiency mortgage pilot programs in five states.

Information kiosks: Small, automated, multi-sided or cylindrical structures placed in public locations and used to provide printed or video announcements of interest to a specific audience or audiences.

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Intelligent Transportation (Vehicle Highway) Systems (ITS or IVHS): Uses computer and communications technology to provide information to travelers about road and transit conditions and to monitor, guide or control the operation of vehicles. Includes concepts such as “freeway management systems,” “urban signal control systems” and “automated highways.”

Intermodal: Refers to transfer facilities where freight or passengers change modes of transport. For example, an airport is an intermodal facility where freight and passengers make intermodal transfers between motorized vehicles and airplanes.

Intermodal connectivity: A seamless transportation system with convenient and reliable opportunities to use more than one mode in a single trip, thereby providing a wider range of cost-effective transportation options.

Intermodal Surface Transportation Efficiency Act (ISTEA): This is a federal law enumerating the policy of the United States to develop a National Intermodal Transportation System that is economically efficient, environmentally sound, provides the foundation for the nation to compete in the global economy and will move people and goods in an energy-efficient manner. The comprehensive coverage of ISTEA is covered by eight titles: Title I-Surface Transportation, Title II-Highway Safety, Title III-Federal Transit Act Amendments of 1991, Title IV-Motor Carrier Act of 1991, Title V-Intermodal Transportation, Title VI-Research, Title VII-Air Transportation and Title VIII-Extension of Highway-Related Taxes and Highway Trust Fund.

Kilowatt: 1,000 watts.

Kilowatt hour (kWh): A unit of electric power consumption indicating the total energy developed by a power of 1,000 watts for one hour. One kWh provides 3,412 British thermal units (Btu) of heat energy. One horsepower equals 746 watts, so a kilowatt hour of energy would operate a one-horsepower electric motor for 1.34 hours.

Life-cycle costing: This is a method of economic evaluation that accounts for all costs, depreciation, incentives, taxes, inflation and the time value of money over the lifetime of a project, process or building. Costs include initial materials, labor and salvage credit; energy, operation, maintenance and replacement costs over the lifetime; final salvage value; and interest or discount over the lifetime. Typically, a lowest initial cost approach serves as the baseline, and all other approaches are compared using one or more of the following analysis tools: total life-cycle cost expressed as net present value, savings to investment ratio, net benefit, internal rate of return or adjusted internal rate of return. Each analysis tool produces the same result, which is the lowest present value of total cost of a project, process or building over its lifetime.

Low-Income Heating Energy Assistance Program (LIHEAP): The federal Low-Income Home Energy Assistance Program, which was enacted by Congress in 1980 to provide financial assistance to eligible low-income households in meeting the rising costs of home energy. LIHEAP is administered by the states under the supervision of the U.S. Department of Health and Human Services. In Missouri, the LIHEAP is administered by the Department of Social Services.

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Low-Income Weatherization Assistance Program (LIWAP): The federal Low-Income Weatherization Assistance Program, which was enacted by Congress in 1976 with the basic purpose of addressing the poor energy efficiency of housing stock owned and rented by low-income households. LIWAP is administered by the states under the supervision of the U.S. Department of Energy. The states enter into contracts with local providers or grantees, who enter into contracts with homeowners and landlords for weatherization assistance. In Missouri, the LIWAP is administered by the Department of Natural Resources.

Major Metropolitan Transportation Investments (MMTI): A high-type highway or transit improvement of substantial cost that is expected to have a significant effect on capacity, traffic flow, level of service or mode share at the transportation corridor or subarea scale.

Major Investment Study (MIS) : A study process initiated to develop or refine the long-range transportation plan, and which leads to decisions by the Missouri Transportation Department, Metropolitan Planning Organizations, other transportation-related agencies and the public on the design concept and fiscal scope of an investment. The purpose of an MIS is to provide information about the likely impacts and consequences of proposed investment strategies and to assist in determining the strategy to be implemented.

Megawatt: 1,000 kilowatts (or 1 million watts).

Methane (CH₄): An odorless, colorless, flammable gas that is the major component of natural gas.

Methanol [CH₂(OCH₃)₂]: A colorless, flammable alcohol sometimes used as a fuel.

Metropolitan Planning Organization (MPO): The organization designated by local elected officials as being responsible for carrying out the urban transportation and other planning processes.

Missouri Highways and Transportation Commission: Established by Article IV, Section 29, of the Constitution of Missouri, as amended November 6, 1979, this public body has authority over all state transportation programs and facilities as provided by state law, including, but not limited to, bridges, highways, aviation, railroads, mass transportation, ports and waterborne commerce. It has authority to limit access to, from and across state highways where the public interest and safety may require.

Missouri Statewide Energy Study: A comprehensive statewide evaluation and planning process implemented in 1991 by the Environmental Improvement and Energy Resources Authority addressing energy, environmental and economic issues and presented in 1992 as a seven-volume report. The study promoted energy efficiency and self-sufficiency as a means to enhance economic growth for the state of Missouri, while at the same time assuring environmental protection and sustained quality of life.

Monitoring and Verification protocol: The protocol was developed to assist in defining the role of energy-savings verification in third-party-financed energy project contracts. The procedures include varying levels of accuracy and cost for verifying baseline and project installation conditions and long-term energy savings. Three monitoring and verification (M&V) options allow the buyer or seller to select the level of savings verification, and thus the risk, they are willing to undertake in the contract with the energy service company.

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Multimodal: Refers to a plan or program that accounts for the needs and/or trends of multiple modes or forms of transport. A multimodal transportation plan or program would address various modes of transportation such as equestrian, pedestrian, bicycle, automobile, bus, train and airplane.

National Clean Cities program: A U.S. Department of Energy initiative program formed in response to provisions of the Energy Policy Act of 1992. With respect to the Clean Cities program, EPACT's primary emphasis is to reduce our dependence on foreign oil through the promotion of domestic, alternative transportation fuels. Section 502 of EPACT requires the Secretary of Energy to "establish a program ... to the extent practicable, [to] ensure the availability of those replacement fuels that have the greatest impact in reducing oil imports, improving the health of our Nation's economy and reducing greenhouse gas emissions."

National Information Infrastructure: The National Governors' Association supports a National Information Infrastructure that provides high-quality, reliable and affordable communication linkages next door and around the world. The NGA policy states that it is essential to the economic competitiveness of the states and the nation, that it has the potential to improve the quality of life for all citizens and that it can enhance the delivery of public services.

National Highway System Designation Act: The National Highway System Designation Act of 1995 was enacted November 28, 1995. It designates the National Highway System (NHS) and allows the release of \$5.4 billion in federal fiscal year 1996 funds authorized by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The NHSD repealed the National Maximum Speed Limit law, allowing states to establish their own speed limits without penalty, repealed the Federal Motorcycle Helmet Use law and required States to enact and enforce "zero-tolerance" laws.

Passive solar system: A system that uses the direct heat of the sun to provide space heat. This heat is usually stored in masonry or water, but no mechanical devices are used to distribute the heat.

Pattonsburg: A town of about 300 residents in northwest Daviess County, Mo. It had suffered repeated damage from flooding over the years and in 1995 decided to move out of the floodplain. It was chosen as one of 16 case studies, and the only rural one, by the President's Council on Sustainable Development.

Performance indicators: Variables that can be used to communicate energy-related information to the general public in a meaningful manner.

Renewable energy: Energy that comes from a source that is not fossil. Renewable energy is generally divided into solar, wind, biomass, geothermal and hydro energies. Hydro energy includes tidal energy.

Show-Me Transportation: Missouri's Long Range Transportation Plan: Missouri's long-range transportation plan to identify strategies and policies to guide future transportation project selection in response to parameters set forth for states' statewide long-range transportation plans by the Intermodal Surface Transportation Efficiency Act of 1991.

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Solar Rayces: An annual event demonstrating solar energy as an alternative transportation fuel source. Several academic institutions from across the United States participate in a transcontinental race of solar-powered vehicles, designed and staffed by students. The program renews and establishes partnerships between educational institutions, whenever feasible, increasing the energy awareness and practical knowledge of students in relevant vocational, undergraduate and graduate programs under the direction of supervised interns on energy-efficiency and renewable-energy projects.

St. Louis Regional Clean Cities program: Initiated by the East-West Gateway Coordinating Council in January 1994 to facilitate local participation in the National Clean Cities Program, this group is a voluntary coalition of public and private organizations that operate vehicle fleets in the St. Louis region or are part of the vehicle or fuel industries serving them. These organizations are working together to expand the use of alternative transportation fuels in the St. Louis region toward achieving clean air, energy independence and economic development goals.

Standard Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings (ASHRAE Standard 90.1): The purposes of this standard is to set minimum requirements for the energy-efficient design of new buildings so that they may be constructed, operated and maintained in a manner that minimizes the use of energy without constraining the building function nor the comfort or productivity of the occupants; provides criteria for energy-efficient design and methods for determining compliance with these criteria; and provides sound guidance for energy-efficient design.

State Energy Conservation Program (SECP): A federal energy program created by Title III of the Energy Policy and Conservation Act (EPCA) of 1975, as amended by the Energy Conservation and Production Act (ECPA) of 1976. The State Energy Conservation Program provided funds to states to plan and effect conservation measures in the operation of State government and in policy areas reserved to the states by federal law. The objective of the SECP was to promote the conservation of energy and to reduce the rate of growth of energy demand through the development and implementation of comprehensive State energy-conservation plans, supported by Federal financial and technical assistance.

State Energy Program (SEP): The conference report accompanying the Balanced Budget Down Payment Act II of 1966, Public Law 104-134, (H.R. Conference Report. No. 537, 104th Cong., 2nd Session (1996), provided the U.S. Department of Energy the opportunity to consolidate two of its formula grant programs, the State Energy Conservation Program (SECP) and the Institutional Conservation Program (ICP), which funded school and hospital energy-conservation measures. They have been combined into the newly named State Energy Program (SEP), which uses the former SECP application process and gives the state more flexibility in implementing energy-conservation measures. Special projects have also been added to the program to encourage states to apply for cutting-edge projects aimed at increasing the use of renewable energy and advanced energy-conservation measures.

State Building Minimum Energy Efficiency Standard: As directed by state statute, Sections 8.800 - 8.851, RSMo, the Department of Natural Resources developed a rule establishing a minimum energy-efficiency standard for state buildings, the State Building Minimum Energy Efficiency Standard, 10 CSR

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140-7.010, which became effective February 25, 1996. The department worked with the Technical Program Task Force, other state agencies, and a voluntary advisory group of state- and nationally recognized experts in the field of energy efficiency to develop the standard.

Surface Transportation Program: A block-grant-type program administered by the Federal Highway Administration (FHWA) that may be used by states and localities for any roads, including National Highway Systems, that are not functionally classified as local or rural minor collectors. These roads are now collectively referred to as Federal-aid roads. The formula for distribution of funds is based on each state's FY 1987-1991 share of total national funding with appropriate adjustment for Interstate Maintenance and Bridge apportionments.

Sustainable St. Louis: A community forum to promote sustainability, or long-term cultural, economic, environmental and social health of the greater St. Louis area and the surrounding region. This group is developing a "Measure of St. Louis" program, which is a set of indicators to mark progress toward sustainability.

Switchgrass: A warm-season prairie grass (*panicum virgatum*) native to Missouri, much of the great plains and eastern United States that is being studied as a possible feedstock for ethanol production and boiler fuel. Switchgrass has already been planted on land in the Conservation Reserve Program.

Technical Program Task Force: A state interagency task force formed to advise the Department of Natural Resources and the Office of Administration on the technical aspects of implementing the Energy Efficiency in State Facilities Program.

Telecommuting: A process of moving information rather than people or vehicles. There are two main forms of telecommuting. The (1) home-based telecommuter works at home and thus avoids commuting to and from the office. The (2) regional-based telecommuter commutes to a regional center set up close to home, and ideally will be able to travel to work by bike or on foot.

Teleshopping: A process of purchasing goods and services through electronic media.

Translinks 21: A 25-year multimodal transportation plan for Wisconsin that proposes state programs and funding for state and local highways, railroads, transit, airports, harbors, intercity bus and bicycles.

Transportation Redefined: The St. Louis Region's (Missouri-Illinois) transportation plan developed by the East-West Gateway Coordinating Council, the St. Louis Region's metropolitan planning organization, in collaboration with area units of local government, business and citizenry.

Transportation Improvement Program: A program of transportation projects, to be implemented over several years, growing out of the planning process and designed to improve transportation in a community. This program is required before a locality may receive federal transit and highway grants.

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Ultracapacitor: An electrical device that can store large amounts of energy. The device does not depend on chemical reactions, so it can be charged and discharged far more rapidly than batteries. The development of powerful ultracapacitors would greatly improve the performance and range of electric vehicles. Traditional batteries could be replaced altogether, eliminating their long charging times.

U.S. DOE Energy Savers program: An innovative approach for developing and introducing new highly efficient building equipment technology through a cooperative research and development program between the U.S. DOE and the private sector. The program approach relies on working closely with the private sector to pull new technology into the market, including, for example, high-volume purchases, utility incentive program coordination, product testing, labeling, sales training and provision of technical information to key segments of the market. The program seeks to increase the market penetration of advanced, energy-efficient equipment for space heating and cooling, water heating, lighting, refrigeration, laundry, cooking, and other services in residential and commercial buildings.

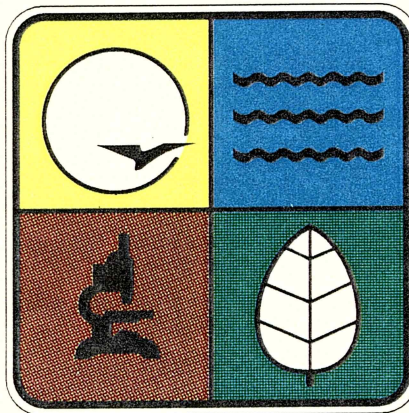
U.S. DOE Rebuild America program: The goal of the Rebuild America program is to improve energy efficiency and reduce energy costs in large numbers of commercial and multifamily buildings throughout the United States. To accomplish this goal, the program is helping to establish community and regional partnerships between local governments and businesses. Working together, these community partners are developing building renovation programs that not only save energy and improve environmental quality, but also serve the unique needs of the local communities.

Veterans Home Loan Program Amendments of 1992: Requires that the Department of Veterans' Affairs (DVA) conduct a demonstration energy-efficiency mortgage program in 50 states for veterans.

Videoconferencing: A process of conducting a meeting or conference through an electronic medium.

Watt: The electrical unit of power or rate of doing work. The rate of energy transfer equivalent to one ampere flowing under a pressure of one volt at unity power factor. It is analogous to horsepower or foot-pounds per minute of mechanical power. One horsepower is equivalent to approximately 746 watts.

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